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The Journal of the International College of Surgeons

FOUNDED IN GENEVA, SWITZERLAND, 1935 - INCORPORATED IN WASHINGTON, D. C., 1940

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Vol. XV FEBRUARY, 1951 No. 2

Original Articles

Gravitational Leg Ulcers and Allied States

H. KELIKIAN, M.D., F.A.C.S., F.I.C.S.
CHICAGO

THE number of men and women who seek advice for recurrent leg ulcers attests to our failure to lend anything more than temporary aid to these patients. A state of wishful dependence on injections, salves, stockings, boots and inadequate surgical procedures warps present-day management of leg ulcers and related conditions. Stagnation may be due to multiple scars insulating the ulcer-bearing area after repeated operations on the tibia, or it may occur from lack of muscular activity and movement, as in cases of arthritis with two or three stiff joints. More commonly it is caused by reverse flow of venous blood and is associated with varicosities of the veins of the leg.

Surgical Pathologic Picture. — The *deep veins* of the leg are only rarely the seat of stagnation; they are located within the confines of the crural fascia and benefit from the squeezing action of muscular contraction. The deep veins exist as numerous anastomotic channels which are equipped with valves; they intercommunicate through and around muscles and accommodate the blood during muscular contractions. As these plexiform vessels approach the joint (the knee, for instance) they thread out into paired or single pathways and from these emerge annectant veins.

Annectant veins connect the deep channels within the crural fascia with the superficial system. They penetrate the deep fascia and must be distinguished from the communicating vessels, which connect the superficial veins outside it. Perforating annectants are at some distance from the joints and escape being stretched or kinked during movements of the segments of the limb. The normal direction of blood flow through perforating annectants is from the deep compartments to the superficial in the foot and in the leg from the superficial to the deep set of veins. However, venous flow in reverse direction is not necessarily pathologic and does not denote valvular incompetence in the annectants, as is generally assumed. In the leg, for example, during heavy muscular activity, excess blood may pass out of the deep channels into the superficial veins by way of the annectants. Perforating annectants are additional safety outlets: during muscular contraction they help to relieve the congestion in the deep veins by permitting the excess blood to pass into the superficial channels. The general disposition of annec-

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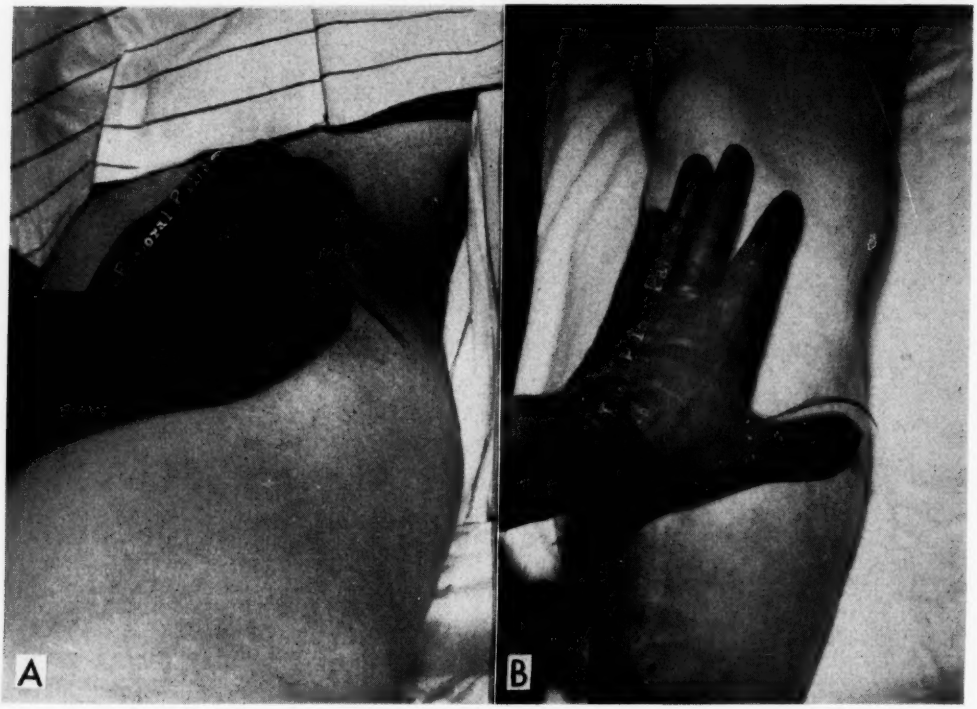

Fig. 1.—Segmental vein ligation. *A*, localizing the saphenous vein in the groin (after W. R. McNealy). The incision here parallels the dorsum of the distal phalanx of the flexed thumb. *B*, localizing the saphenous vein below the bend of the knee. Here the skin cut runs parallel to the volar surface of the abducted and extended thumb.

tants is more or less transverse or at an angle to the longitudinal axis of the limb. They become dilated up to their point of entrance into the deep fascia. Varices do not extend into the portion of the annectant inside the deep fascia; nor does inflammation, except on rare occasions. With the enlargement of their caliber, the valves of the segment of the annectants outside the deep fascia separate. The resulting incompetence extends to the deep fascia, not inside it: varices within and around muscles are rare. Extrafascial varicosities of annectant veins and incompetence of their valves is secondary to stasis within the superficial set of veins, or the saphenae.

The short saphenous vein, which is the remnant of the postaxial, or sciatic vessel, loses its longer femoral stem and empties into the popliteal trunk. Occasionally it opens instead into the greater saphenous vein; more often the two are linked by several communicating branches. When the short saphenous vein connects with the popliteal vein, as it usually does, it pierces the deep fascia 2 to 4 inches (5 to 10 cm.) below the bend of the knee and passes upward between the fleshy bellies of the gastrocnemius. It is thus partly overtaken by the deep fascia and benefits from the contraction of the muscles of the calf. The unsupported portion occasionally becomes overfilled by the backflow from the greater saphenous vein through superficial communicating branches. Less commonly, reflux flow from the popliteal vein causes stagnation within the short saphenous trunk. Stasis in the short saphenous is occasionally the cause of an ulcer which overlies the distal part of the fibula or the outer malleolus of the ankle. The terminal sensory branch of the musculocutaneous nerve crosses this area, and ulcers

along the lower lateral aspect of the leg are inordinately painful.

The long saphenous vein is the main channel of gravitational stasis. It is the longest vein of the body, and throughout its entire course it travels within the subcutaneous fascia; it receives no muscular support. Developmentally it constitutes the unaltered remnant of the primitive preaxial vein. It loses no segments, as does the short saphenous, and enters into the deep fascia to connect with the femoral vein in the groin. In the fetus, about the fifth month, the long saphenous receives its full quota of valves, which vary from eight to twenty pairs per vein. Thereafter, if anything, the valves diminish in number; they do not increase. With the growth of the limb, before and after birth, the vein stretches to an inordinate length. The segment between alternate sets of valves becomes elongated. In adults the column of blood sustained by a pair of valves of the vena saphena magna is longer than that of any other vein in the body.

Apart from its length and lack of muscular support, the long saphenous vein suffers most from the effects of gravity, as the direction of blood flow within it, in standing and walking, is antigravitational. Gravity dams the blood back into the lower reaches of the vein. Excess blood causes loops of the vein to dilate and become tortuous; more blood stagnates, and the heavy load hastens the final breakdown of the already weakened, inadequate valvular support. Venous flow often assumes a reverse course downward toward the leg. Pooled blood is poor in oxygen content, poorer than ordinary venous blood; its cells age and disintegrate without entering into the general circulation. Broken-down blood elements seep through the weakened venous walls into the subcutaneous tissue, pigmenting and discoloring the skin.

The distal portion of the long saphenous vein runs across the medial surface of the tibia, just above the ankle joint, where the skin forms a snug sleeve. This segment of the vein does not benefit from the transmitted impulse of muscular contraction. It can only empty itself with the movements of the ankle: when the ankle is plantar-flexed, the vein is flattened out against bone by taut skin. Stagnation here is common, especially in persons with stiff ankle joints. The overlying skin is comparatively immobile, poorly nourished and extremely vulnerable. Trauma, passive congestion and tissue anoxia perhaps all contribute to its final breakdown. Ulceration invites infections of varying intensity; the subcutaneous tissue under and around the ulcer becomes infiltrated, thickens and undergoes extensive fibrosis. Within this matted scar lie pipelike sclerotic veins which fail to collapse even with carefully applied pressure bandages. Blood trickles through them in reverse direction into the ulcer and infection invades

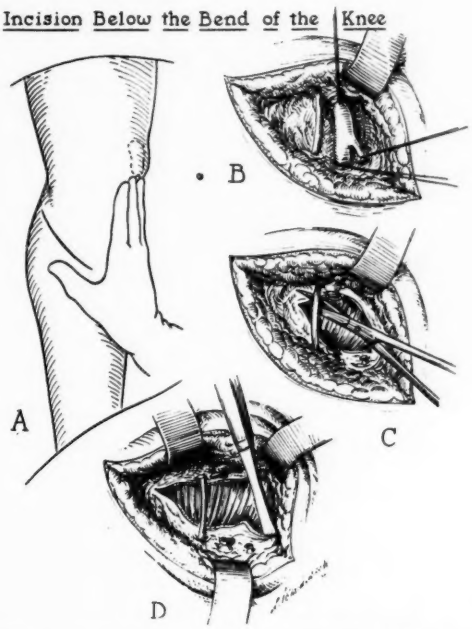

Fig. 2.—Crural fasciotomy. The incision below the bend of the knee, like the others in the lower part of the leg, serves the dual purpose of vein ligation and fasciotomy. *A*, the incision to locate this portion of the saphenous vein and at the same time to slit the deep fascia underneath it parallels the volar surface of the surgeon's abducted thumb. *B*, the saphenous vein and its smaller tributaries are ligated. The saphenous nerve, which comes down from Hunter's canal, lies on a deeper plane and somewhat posterior to the vein. It is isolated and left intact when the ulcer is painless; it is severed in extremely painful ulcers. *C*, the crural fascia overlying the origin of the flexor group of muscles and the medial belly of the gastrocnemius is widely slit. *D*, the fascia is stripped away from the medial border of the tibia.

their interior; the lumens of the veins become partially or completely plugged with thrombi. Phlebothrombosis, thrombophlebitis, periphlebitis, cellulitis and fibrosis of the subcutaneous tissue coexist and contribute to one another. There is a variable degree of anoxic thickening of both skin and skeletal elements. However, inflammation seldom extends beyond the inner surface of the deep fascia into the muscular compartment, though its outer aspect becomes thick, scarred and matted with the superficial fascia and the skin.

The deep or crural fascia envelops and anchors the muscles of the leg. It encloses the main arterial trunks. Within its confines the deep lymphatics run along the arteries and afferent flow of lymph is greatly added, whipped, by arterial pulsation as well as by muscular contractions. Superficial lymphatics of the leg accompany the veins, through the unsupported subcutaneous fascia. There exists no communication between the deep and superficial lymphatic systems of the leg except near the joints through lymph nodes. The

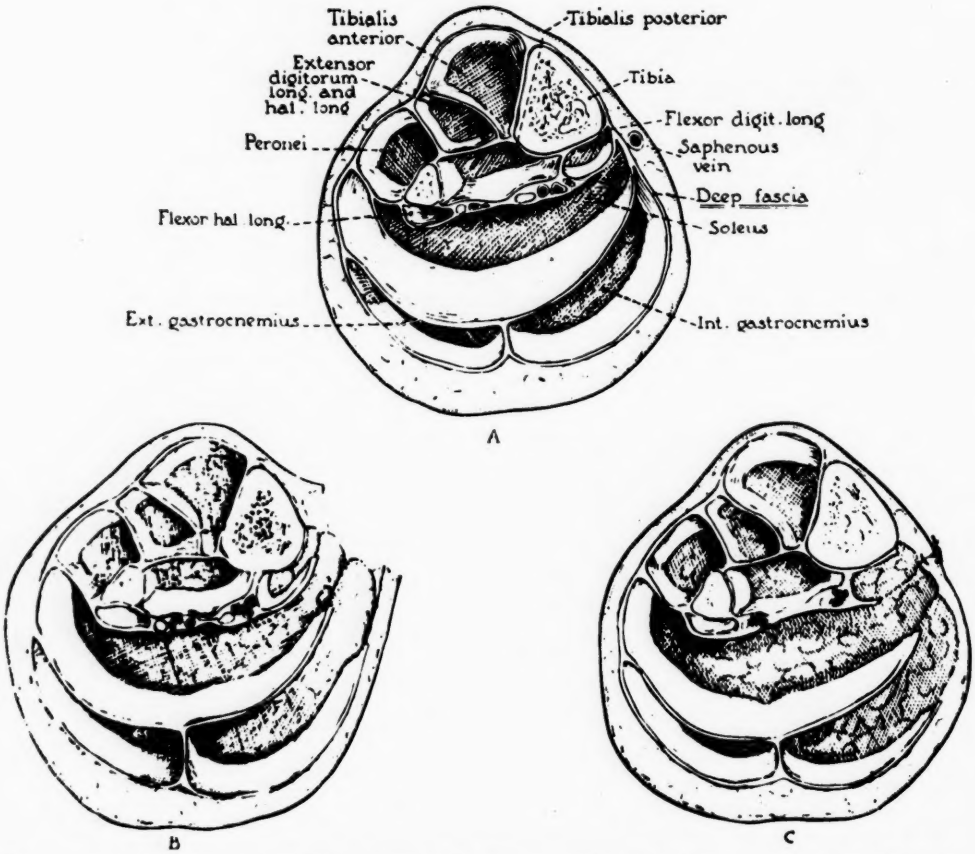

Fig. 3.—Crural fasciotomy as depicted by drawings of a cross section of the leg. *A*, section through the leg slightly below the level of the preceding incision, showing various fascial compartments. (Redrawn from J. M. Bourgery's *Inconographia D'anatomia Chirurgia E di Medicina Operatoria*, Florence, 1841.) *B*, sketch indicates removal of the fascia over the medial belly of the gastrocnemius and the flexor muscles and extirpation of the septum between these two compartments. *C*, only the skin is sutured.

thick crural fascia forms a veritable block between the two. With fibrosis and matting of the sbucutaneous tissue as well as of the superficial layer of the deep fascia, lymphatic drainage around the ulcer is definitely hampered. Tissue fluids cannot drain cephalad through scarred subcutaneous tissue unless the barrier of the deep fascia is removed. Removal of the deep fascia allows the muscular contractions to lend their beneficial pumping support to the remnants of superficial lymphatics and the veins. Extirpation of fibrous matting from around the ulcer itself permits muscular tissue to come into direct contact with avascular skin. Muscles are richer in arterial supply than fascia and can sprout granulations with greater ease and abundance. After all, it is vascular granulation which heals wounds and restores tissues to a healthy state and appearance.

Management.—The treatment of gravitational leg ulcers and allied conditions revolves around three basic tenets: (*1*) vein ligation to stop reverse flow and break the long column of stagnant blood in the saphenous system into smaller segments; (*2*) fasciotomy or fasciectomy, whereby the barrier between the muscular and subcutaneous compartments of the leg is removed so that superficial veins and lymphatics can benefit from the squeezing action of muscles and empty themselves upward, against gravity; (*3*) pressure dressings to afford the ulcer and its surroundings rest and the limb uniform support and compression, which the snug stocking of skin normally does in the young—before it has lost its turgor and has been pushed away from the deep fascia and the muscles within it by overfilled tortuous veins, deposits of fat, stagnant fluid and products of inflammation.

(*1*) *Segmental Vein Ligation:* It is perhaps safer to disregard all previous attempts at high ligation of the saphenous vein and explore the groin. To locate the saphenous vein below Poupart's ligament the surgeon uses whichever of his hands is contralateral to the patient's leg (right hand for right leg). He holds his hand as if writing with an imaginary pencil and sinks the tip of his ring finger into the groin of the patient, along the inguinal ligament, midway between the pubic crest and the anterior superior spine of the ilium. With the ring fingertip he locates and feels the pulsations of the femoral artery. On the outer side of the palpating digit lies the femoral nerve in line with the small finger; on the inner side, underneath the pulp of the long finger, passes the femoral vein; the index finger points to the femoral canal, and the thumb overlies the portion of the saphenous vein to be ligated (Fig. 1A). An incision 2 to

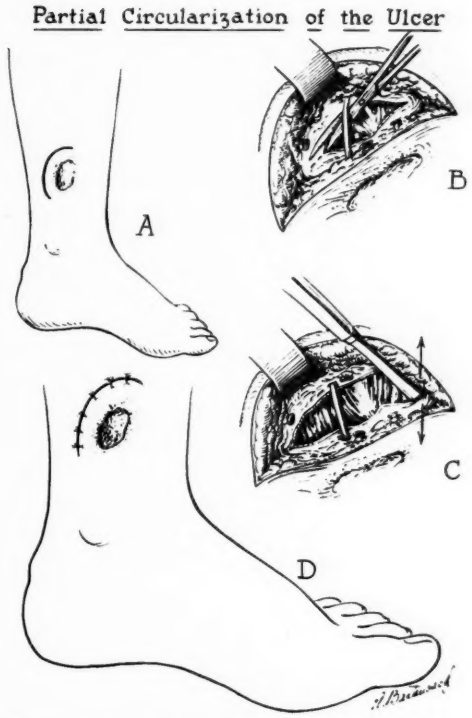

Fig. 4.—Crural fasciotomy and partial insulation of the ulcer-bearing area. *A*, an incision, somewhat semicircular, is drawn around the ulcer, about 1 cm. above and behind its indurated border. Lately we have been favoring incisions which are less circular and more oblique or longitudinal. They are less likely to cause sloughs. *B*, all the veins leaking into the ulcer by reverse flow are doubly ligated and cut between the ligatures. If the ulcer is painful and the saphenous nerve is scar-bound, the nerve is also severed. Otherwise the saphenous nerve is left undisturbed and the crural fascia under it is slit transversely. *C*, the deep fascia is then stripped up and down from the medial border of the tibia. *D*, only the skin is approximated. The skin in this potentially infected area is preferably sutured with wire.

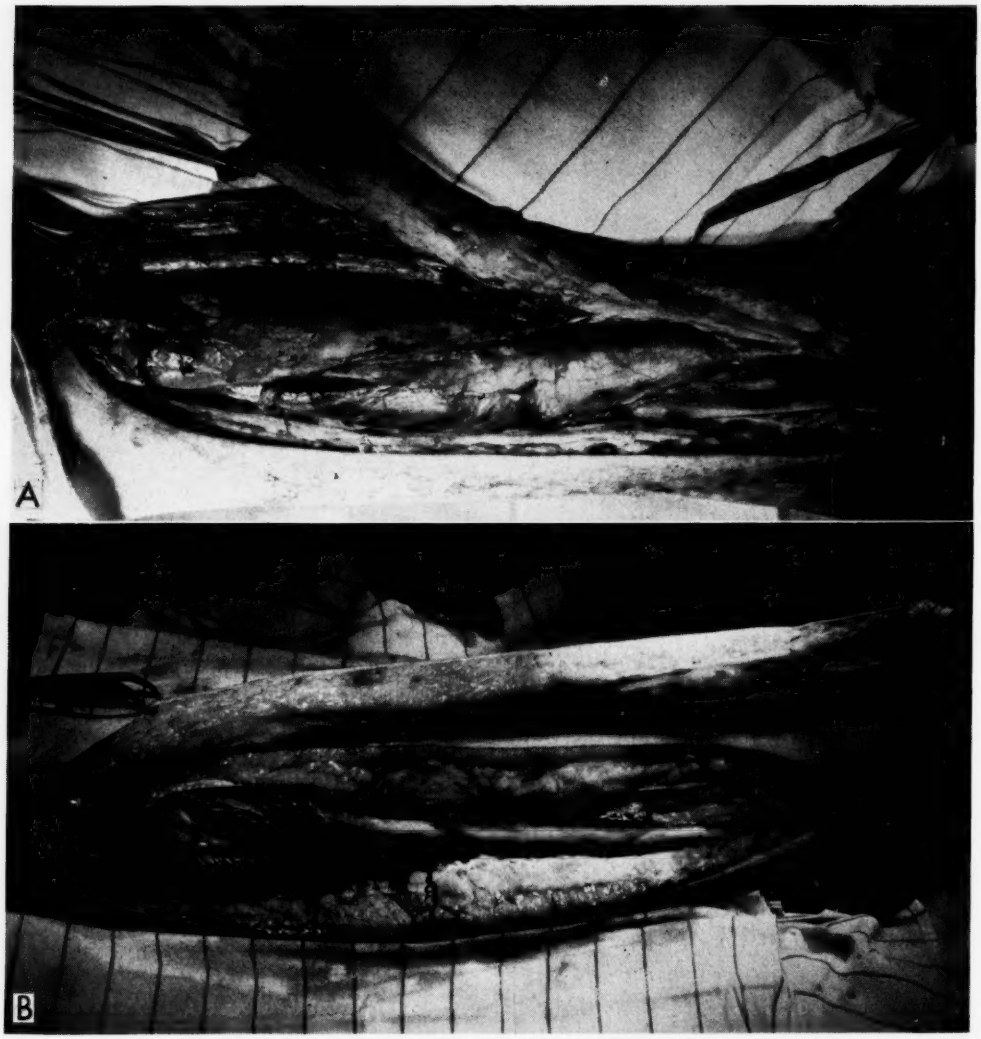

Fig. 5.—Variations: crural fasciotomy and fasciectomy through axially placed incisions. *A*, incision over the medial aspect of the leg removing a longitudinal strip of fascia. This operation is specially indicated where there is marked induration of the limb. *B*, incision over the lateral aspect of the leg excising a long elliptic segment of the skin, the underlying fat and the deep fascia; this is indicated in cases of elephantiasis. A similar procedure may be carried out three months later on the medial side.

3 inches (5 to 7.5 cm.) long and parallel to the inguinal crease is drawn through this point. The incised edges of skin are held up by nonerushing Allis forceps or towel clips. The upward pull of the skin away from the recumbent patient allows the saphenous vein to drop on the deep fascia, and the interval may be sharply cut through with impunity. The fibroadipose tissue surrounding the vein is cleared by blunt dissection, and the vein is delivered through the incision. The vein is clamped, pulled distally and dissected clean

until all its tributaries and its point of entrance into the deep femoral vein come into view. The tributaries are caught, doubly ligated and cut between the two ligatures. The saphenous trunk itself is ligated just distal to the saphenofemoral junction and about 2 inches (5 cm.) below, and the intervening segment is resected. Only the skin is closed.

After high ligation, the saphenous vein is again ligated below the bend of the knee, distal to where it sends communicating branches to the short saphenous vein and the popliteal vein. Using the same hand for palpation, the surgeon locates this point as follows: with the tip of the ring finger touching the inferior pole of the patella, the palm is allowed to rest on the front of the proximal tibia with the thumb in abduction (Fig. 1*B*). An incision is drawn parallel to and a fingerbreadth above the volar surface of the surgeon's thumb resting on the patient's leg. This incision is in line with the normal skin crease below the knee. It starts at the inner border of the tibia and ends over the medial belly of the gastrocnemius muscle. Small venous tributaries underneath the skin are isolated and ligated and cut between the ligatures. The incision is deepened down to the fascia and the saphenous vein is dissected out. The vein passes obliquely from behind the region of the medial

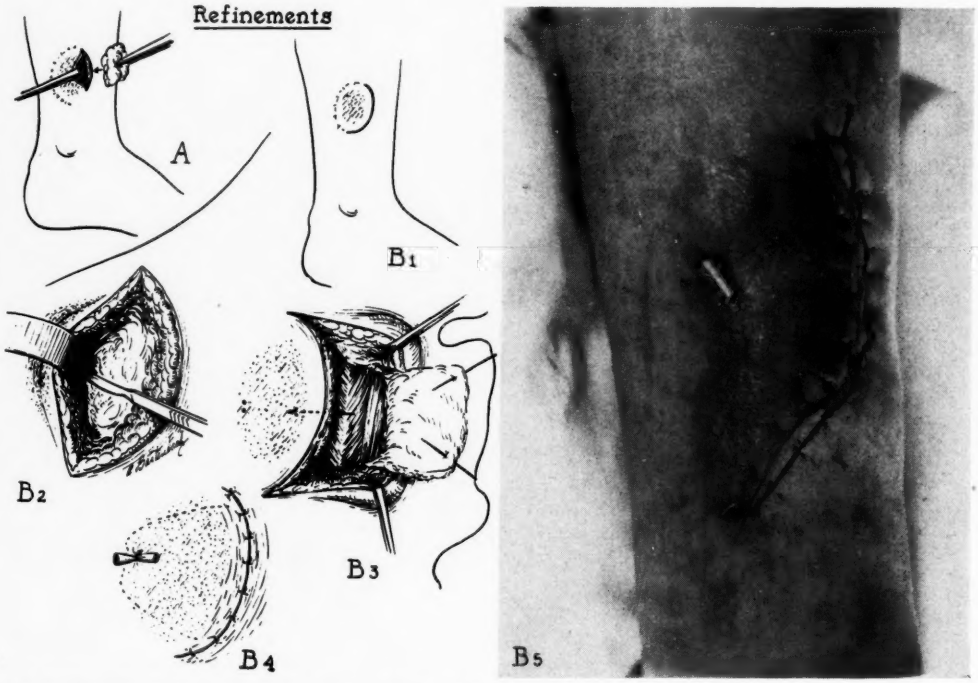

Fig. 6.—Refinements: Three or more months after the ulcer has completely healed, several operative procedures are resorted to in an attempt to pad adherent, painful or pruritic scars. *A*, demonstrates feeding of a small morsel of free, autogenous fat through a small slit around the margin of the healed ulcer. B^1 indicates the incision for underlining the scar with a fascial flap. B^2 shows undercutting and lifting of the previously adherent scar. $B,^3$ a pedicled flap is prepared from in front of the leg, utilizing the fascia which covers the extensor muscles of the toes and tibialis anticus. Its free lateral margin is secured by two needles bearing the same thread. $B,^4$ the fascial flap is turned medially over its attached border; it is flattened and adjusted under the lifted scar; the needles are then passed outside the skin and the anchoring suture is secured to a rubber tubing at the base of the lifted scar. The skin is closed over the underlying fascial flap. B^5 illustrates $B,^4$ which was actually performed.

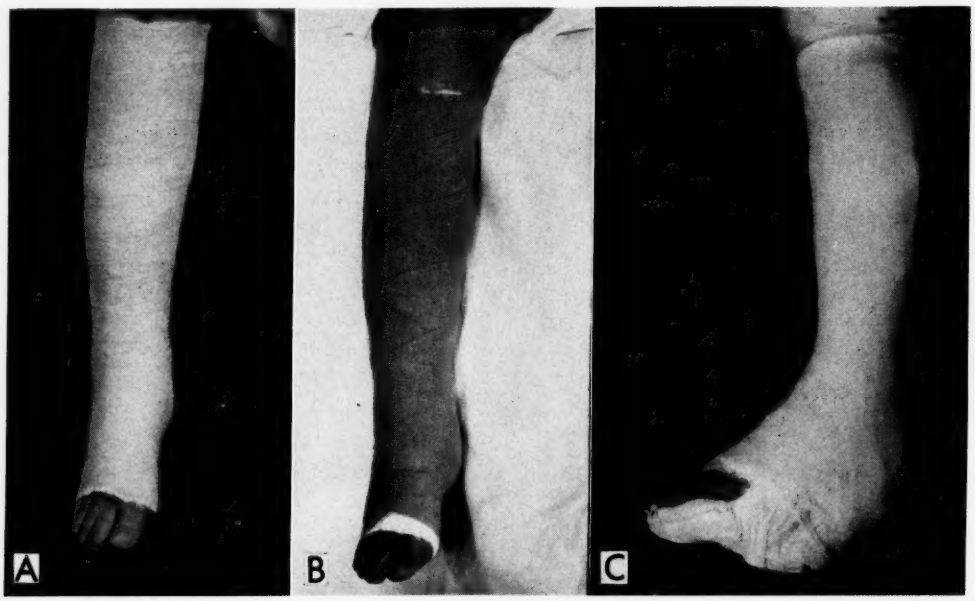

Fig. 7.—Boots and bandages. Supportive appliances are utilized as indicated. *A*, Unna's boot. *B*, mildly compressive elastic bandage over Unna's boot. *C*, plaster cast with walking heel applied over both Unna's boot and elastic bandage. The latter is especially useful for ulcers which are infected or are likely to be affected by the movements of the ankle.

condyle of the femur toward the inner border of the proximal tibia. The saphenous nerve traverses behind the vein, closer to the deep fascia. It need not be disturbed. The vein is caught, doubly ligated and the segment between the two ligatures is resected.

(*2*) *Crural Fasciotomy:* There are numerous instances in which adequate segmental vein ligation has already been performed but the ulcer, the surrounding induration and the swelling persist. The fact that by fasciotomy or fasciectomy, muscles can be delivered out of their tight compartments and allowed to impart their beneficial impulse to the superficial veins and lymphatics has not been sufficiently emphasized. Fasciotomy is initiated through the incision just described for ligation of the saphenous vein below the knee, and it is carried out at the same sitting as for segmental vein ligation. The deep fascia overlying the medial head of the gastrocnemius is slit wide open and the muscle belly is allowed to bulge into the subcutaneous space. The deep fascia is released from the intermuscular septum; its attachment to the medial border of the tibia is stripped as far down as the incision will permit. When the ulcer is low, nearer the tibial malleolus, the long saphenous is also ligated at the level of the midcalf as it courses down behind but superficial to the medial border of the tibia, a fingerbreadth away from it. Here too the crural fascia is detached from the medial border of the tibia (Figs. 2 and 3). About ½ inch (1.2 cm.) from the proximal pole of the ulcer another incision is made, which may run parallel to the incision below the knee or may partly circle the ulcer or its indurated border. Here too the incision cuts through skin and deep fascia, severing and ligating all the veins that lend to the ulcer. The deep fascia is then lifted by a periosteal stripper from the medial border of the tibia up in cephalad direction until it meets the facial detachment made by the proximal incisions; it is also unmoored from the intermuscular septum. Depending upon its viability, the proximal skin edge is undercut and the thickened fascia under it is removed. Because

of poor arterial blood supply the skin toward the ulcer is not undermined. Near the ulcer, where there is greater likelihood of infection, the edges of the skin are approximated by interrupted wire sutures, which are tied over a piece of black silk to aid identification three to four weeks later when the sutures are removed (Fig. 4).

When the leg is extensively indurated, fasciotomy is carried out through a long longitudinal incision along the medial border of the tibia. In the presence of varicose elephantiasis the redundant skin and the underlying fat and vein-bearing fascia are removed through an extensive axially placed longitudinal incision. Longitudinal incisions are also preferred when the circulation of the limb is precarious (Fig. 5).

Secondary surgical procedures in three to four months may or may not be indicated. Usually, when the ulcer overlies tendons or bony prominences, it heals with an adherent scar. It may cause contracture or pain. Cutaneous nerves traversing through the scar may have to be cut. There may be other veins around the uncut border of what was once an ulcer; these may keep the thin, scarred skin moist and itchy. It is then expedient to complete insulation of the ulcer-bearing area so as to sever any possible communicating veins which might feed the region by reflux. It is not beyond the ken of present day surgery to underlie the scarred skin with a fascial flap or even with free grafts of subcutaneous fat. After this second stage the principles of compressive boot or cast are observed and carried on until firm healing of the cutaneous edges is affected and swelling of the ankle has well abated (Fig. 6).

(*3*) *Supportive Dressings:* Casts, bandages or boots are applied immediately after operation, over the fine-meshed gauze, or on the following day. Usually the limb is encased in an Unna's boot which covers all the area from the base of the toes up to the level of the tibial tubercle. Unna's boot is reinforced by a mildly compressive, uniform elastic bandage. In case

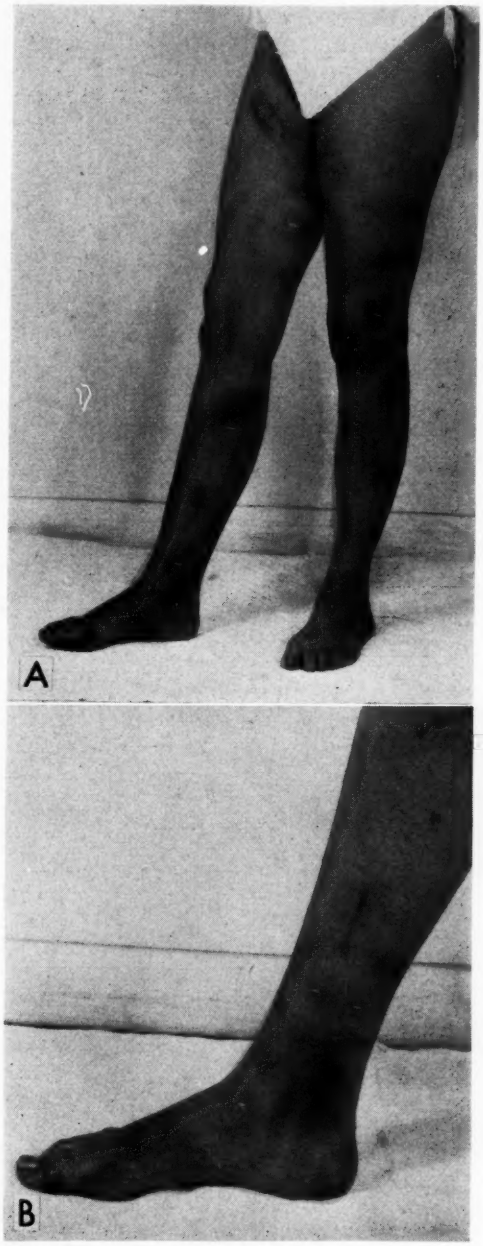

Fig. 8.—Ulcer overlying the flexor retinaculum of the ankle in a woman, aged 46. Previous treatments: periodic application of Unna's boot; elastic stockings and injections of sclerosing solutions. *A* shows the entire right leg with multiple incisions for segmental ligation of the long saphenous and crural fasciotomy. *B* represents the same six weeks later.

A
B

Fig. 9.—Ulcer overlying the tibial malleolus in a woman aged 50. No previous treatments. *A*, ulcer. *B*, direction of healed incision three months after operation. Note the direction of the healed lower incision. This is an improvement over circular incisions.

tension and stress are anticipated by the movements of the ankle, short leg plaster cast with a walking heel, or caliper is in addition applied. The patient is allowed to walk. Pressure bandages, boots or casts are changed as it becomes expedient, usually every six weeks, until the ulcer is epithelialized. On the whole, this takes from two to four months depending upon the size of the ulcer and its location. Ulcers over the malleoli heal sluggishly (Fig. 7).

COMMENT

There are several points which brook controversy. One of these relates to the advisability of the operation for the old and debilitated, who are most frequently afflicted by leg ulcers. Apart from severe diabetes, cardiac decompensation and occlusive arterial disease there exist no serious contraindications to surgical intervention. With all due respect to Brodie, Trendelenburg and Perthes, tests for incompetence of the saphenous system, of reflux through communicating veins and patency of deeper channels, hardly yield any valuable information in the presence of sizeable varicose ulcers with regional induration of the skin and fascia. What is more important is the *arterial pulse beyond the ulcer,* as

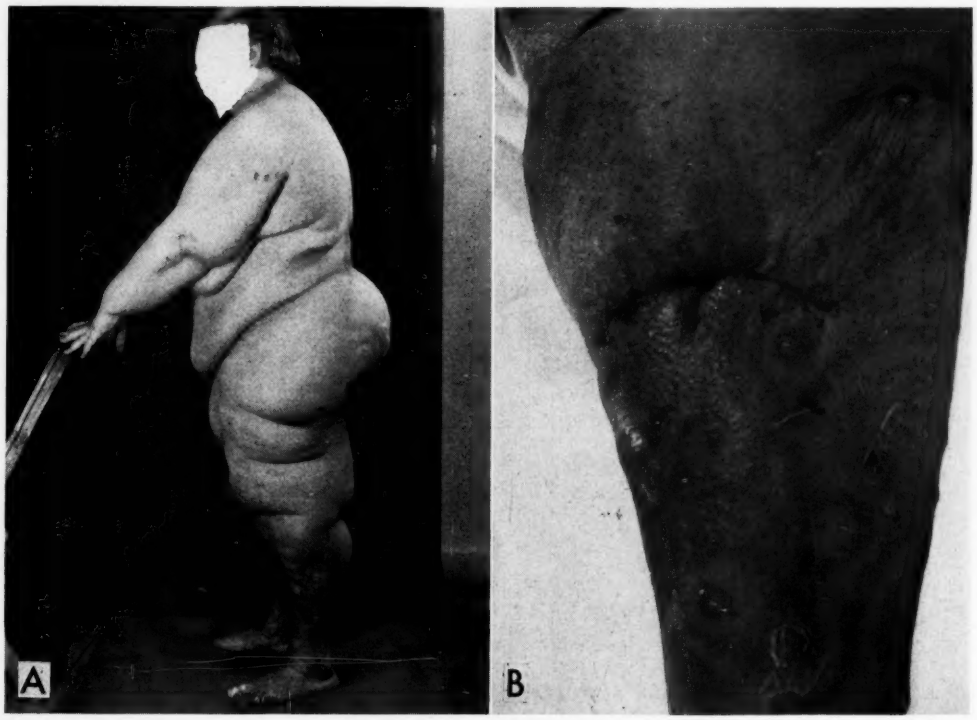

Fig. 10.—Stasis ulcer in an extremely obese woman aged 64. The body weight without clothes has varied from 340 to 389 pounds (154.2 to 176.4 Kg.). At the time of operation, it was 354 pounds (160.6 Kg.). Electrocardiogram revealed myocardial heart disease with bundle branch block. The duration of the ulcer was five years, and it had been like other ulcers over the lateral aspect of the leg, excruciatingly painful. Previous treatments: periodic rest in bed and topical applications of penicillin and cod liver oil ointment; also medicated ace bandages. *A*, left profile of the body as a whole. *B*, lateral view of the leg two months after fasciotomy, showing complete healing of the ulcer. High vein ligation was not even attempted in this case.

obtained from the dorsalis pedis or the posterior tibial arteries and the appearance of the ulcer itself. In the presence of fresh thrombophlebitis involving the deeper veins and fulminant regional infections, operation is postponed. The limb is given cleansing care, wrapped with a mildly compressive bandage and elevated. When infection is moderate or quiescent and there are no reactions such as elevated temperature, the limb is encased in an Unna's cast and the patient is asked to return in a month. Mild infections, which almost invariably complicate varicose ulcers, are no contraindication to judicious surgical treatment. Thrombophlebitis of the superficial saphenae is best treated by high ligation, pressure bandages and ambulation.

A second controversial point pertains to the value of sclerosing solutions for gravitational ulcers. Sclerosing solutions are of benefit in causing occlusion of tortuous secondary saccules in the subcutaneous space. Their value in occluding the main stem of the saphenous vein is questionable. They do cause fibrosis of the superficial fascia, which may not have any deleterious effect on the ulcer if the injection is confined to the region of the thigh. Fibrosis of the superficial fascia of the lower part of the leg enhances neither the healing of the ulcer nor the associated lymphedema of the leg. It aggravates both.

Another debatable point concerns skin grafting in expediting the rapid healing of ulcers. Gravitational leg ulcers appear larger than they actually are, owing to the associated swelling of the leg. A pressure bandage, rest and elevation of the limb will reveal the actual size of the ulcer, which in most instances is too small to warrant skin grafting. Moreover, gravitational ulcers are comparable to burns;

Fig. 11.—Large infected leg ulcer of many years' duration which had already caused extensive skeletal hyperostosis. The patient was a man, aged 60. About fifteen years ago he had a resection of the prostate gland which was followed by complete urinary incontinence and deep thrombophlebitis of the right leg. Later a large leg ulcer developed. No treatments were instituted except supportive bandages. *A*, both legs are here presented to show the comparative enlargement of the ulcer-bearing limb. It was deemed wise to postpone operation; the limb was encased in a snugly fitting short leg cast with a walking heel. Four weeks later, after removal of the walking cast, the ulcer had become much smaller and the leg was in better condition. Fasciotomy was then performed. *B*, the same, three months after surgical treatment.

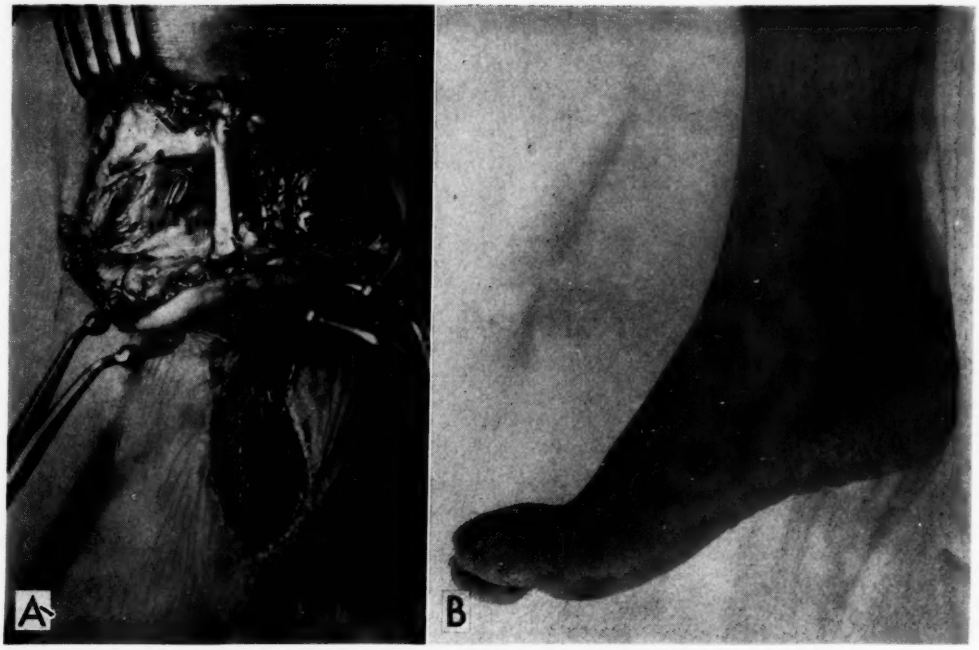

Fig. 12.—Extremely painful ulcer over the fibular malleolus in a woman aged 58. The ulcer has been present "for the past several years." Previous treatment: vein ligation three years ago; bandages and salves. *A* demonstrates the undercutting of the skin and splitting of the deep fascia in order to allow the peronei and extensor group of muscles to bulge freely into the subcutaneous spaces. The cordlike structure seen was the hypertrophied, scar-bound, sensory terminal of the musculocutaneous nerve. Because of inordinate pain it was resected. *B*, healed ulcer three months after segmental vein ligation and fasciotomy.

a great many epithelial cells within the limits of the ulcer survive in pores and sweat glands, and from these the denuded area epithelizes as fast as it would require skin grafts to thrive and "take." It should also be recalled that gravitational ulcers occur in the lower part of the leg, overlie the distal portion of the tibia, and occasionally extend backward and down, overlapping the tendons of the tibialis posterior and flexor digitorum communis. The area is poorly supplied by arterial twigs; it is underlined by fibrous periosteum and avascular retinacula, which hold the tendons close to the bone. In order to create a favorable matrix for skin grafts, one must remove the fibrous layer of the periosteum, the deep fascia and its retinacular thickenings. A split thickness graft, even if it takes, will adhere to bone and tendons; a full thickness free graft will hardly survive in a potentially infected area. A pedicled flap crossed from the opposie limb may provide a padded covering and is feasible for the young. Older patients, who are more frequently afflicted with gravitational leg ulcers, will not tolerate the contortion and strain which accompany the immobilization required for cross-leg flaps. Then again, skin grafting requires prolonged hospitalization and recumbency, which in most instances is not economically feasible.

There are, finally, several moot problems that need clarification. One of these concerns ulcers which complicate old, chronic phlegmasia alba dolens or phlebitis of the femoral vein. It should be noted that, by the time ulcers have developed in deep femoral obstruction, compensatory anastomotic channels have already established themselves. There is therefore no valid contraindication to judicious segmental ligation of the long saphenous,

Fig. 13.—Stasis elephantiasis with marked thickening of the subcutaneous fascia and moderate pigmentation of skin in a man, aged 64. Varicosities for twenty-odd years. Previous treatments: sclerosing injections, over fifty of them; supportive stockings. *A*, leg before segmental vein ligation and crural fasciotomy. *B*, six months after operation through two elliptic incisions removing redundant skin subcutaneous veins and fat and a strip of fascia.

or to fasciotomy and insulation of the ulcer. Another point which needs to be touched upon relates to the comparative benefit derived from various supportive appliances. The time-honored Unna's boot has no advantage over an ordinary elastic pressure bandage except for the fact that it is not removable; it necessitates infrequent dressing and disturbance of the wound. A good method is to put a thin layer of Unna's boot and apply a mildly compressive unifom elastic bandage over this, from the base of the toes up to the bend of the knee. When the ulcer is affected by the movements of the ankle it is best to incorporate a short leg cast with a walking caliper or heel.

SUMMARY AND EXTENSION

The pathogenesis and the management of gravitational leg ulcers are discussed, and several representative cases are appended in the accompanying illustrations. The treatment consists of three distinct, dovetailed procedures: (*1*) segmental ligation of the saphenae, usually the large; (*2*) crural fasciotomy, and (*3*) pressure dressings. Division of the long saphenous column into smaller segments partly alleviates the load sustained by overburdened valves; extirpation of the thick crural fascia removes the barrier between the scarred subcutaneous space and the lush muscular compartment. Healthy tissues are thus brought into contact with fibrotic ill-nourished skin; muscular contractions come to the aid of the sluggish lymphatic and venous flow within the subcutaneous tissue. The two procedures, vein ligation and fasciotomy, are both utilized in what amounts to a planned insulation of

the ulcer itself. An oblique or semilunar incision is made around the proximal pole of the ulcer 1 cm. from its indurated border, cutting through skin and fascia, ligating all the veins that might leak into the denuded area and partly extirpating the underlying scarred tissues. In three months, the circle around the distal pole of the ulcer may have to be completed. Such refinements as padding the healed scar with a fat-bearing seam of fascia or free fat are resorted to only in order to procure movable, painless scars. Through-

Fig. 14.—Stasis eczema and ulcer due to multiple operation for old osteomyelitis in a man aged 31. Osteomyelitis healed, leaving a markedly hypertrophied bone with a tense, fungating skin over it. Through an axial incision fasciotomy and ostectomy was performed resecting along longitudinal segment from the anteromedial aspect of the tibia diminishing the size of that bone. *A*, before fasciotomy and ostectomy. *B*, six months later.

out the treatment, such supportive measures as pressure bandages or walking casts are employed so as to enable the patient to carry on an ambulatory, self-serving regime of life.

It would be fallacious to suggest that the pattern of management herein propounded will serve as a panacea for all leg ulcers. The three basic principles of the treatment—segmental vein ligation, crural fasciotomy and pressure dressings—are to be regarded as themes, and variations on any one of them or on the combination may be developed to meet the exigencies of a given case. Stasis constitutes the main episode in the chain of events which culminate in gravitational leg ulcers. Stases vary. Other variable factors enter into the picture and modify the treatment. The management must be made pliable. It should be curtailed, amplified or even extended as the occasion demands:

1. In its simplest form, stagnation is due to valvular incompetence and reverse flow of blood within the superficial veins of the leg. Here segmental ligation of the saphenae will suffice.

2. With the inception of phlebitis and periphlebitis there is damming back of the lymphatic stream, since the superficial lymphatics of the leg run in intimate relation to the veins; they are simultaneously involved in inflammations. In this instance, in addition to perverted venous hydrodynamics, there are the factors of lymphedema and the outpouring of inflammatory exudates: segmental vein ligation must be supplemented with rest and pressure bandages.

3. Often, in the aftermath of inflammation or in the presence of long-standing chronic stasis, the subcutaneous tissue is thickened; matted fibrous bands hamper the already impaired venous and lymphatic circulation. For some reason fibrous deposits are most abundant along the external surface of the deep fascia. The thickened, bound-down crural fascia fails to transmit the impulse of muscular contraction within its confines to the superficial veins and lymphatics outside of it. In other words, the deep fascia becomes converted to an unyielding, impervious barrier between the muscular compartment of the leg and the subcutaneous tissue. Extirpation of the crural fascia will open the way for the beneficial squeezing action of the muscles and allow it to be transmitted to the patent remnants of superficial veins and lymphatics. It is also possible that when portions of the deep fascia are removed new avenues of absorption are opened and stagnant fluids within the subcutaneous fascia are sidetracked towards the muscular compartment of the leg (Figs. 8, 9 and 10).

4. In ulcers which develop in the wake of deep thrombophlebitis the superficial venous channels are secondarily involved. Given time, the plugged veins may become canalized or adequate anastomotic pathways may be established; but the ulcers pursue an indolent course. Here again, segmental ligation of the saphena and crural fasciotomy are of definite value when judiciously carried out and timed well—usually two or more years after the acute attack (Fig. 11).

5. Patients with gravitational leg ulcers and varicosities usually have good arterial circulation. As early as 1828 John Scott noted that in the presence of venous stasis the arterial bed of the limb is flushed. I have repeatedly observed the absence of roentgenologically manifest arteriosclerosis in the leg bearing the ulcer as compared to the opposite side. There are, however, instances in which occlusive arterial disease and venous stasis coexist —in fact, phlebitis migrans often accompanies thromboangiitis obliterans. In treating these conditions it goes without saying that the state of the arterial circulation must be given first and foremost consideration; when there is demonstrable vasospasm, sympathectomy must be performed in preference to vein ligation and fasciotomy. In a few cases of thromboangiitis obliterans with intermittent claudication the patients reported relief of pains in the calf after the fascia over the bellies of the gastrocnemius muscle was split and the muscle was freed from its stiff fascial envelope. Judicious vein ligation can not harm these patients, who often require physiotherapy, and such measures as massage become less hazardous when the veins have been ligated proximally.

6. In the presence of painful ulcers, what John Hilton advocated in the past century in his classic *Rest and Pain* still holds true. Hilton advised resection of the cutaneous nerve passing through the area of ulcer to

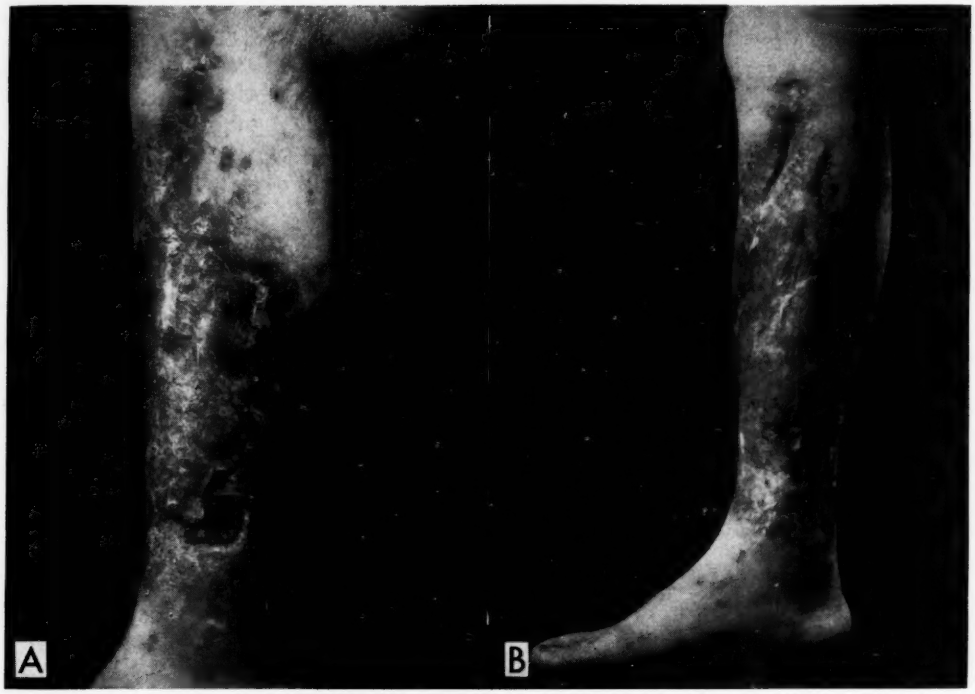

Fig. 15.—Stasis eczema due to lack of joint movement and muscular activity in a man aged 60 who had suffered from a compound fracture of both bones of the leg eight years prior. The injury was followed by severe sepsis. Both the knee and the ankle became involved and eventually ankylosed. The fractures healed, but as he began walking an extensive weeping dermatitis developed. The saphenous vein was segmentally ligated, but to no avail. Nor was fasciotomy preceded and followed by penicillin therapy of any avail. In the presence of stiff joints above and below, muscles of the leg could not function to impart their beneficial squeezing action to the veins and lymphatics under the skin. It was then decided that arthroplasty and mobilization of one of the joints would help. *A*, before arthroplasty and mobilization of the knee. *B*, three months after active movement of the knee has been carried on.

afford the latter "physiological rest." Ulcers over the outer malleolus of the ankle are inordinately painful: in addition to vein ligation and crural fasciotomy, the terminal sensory branch of the musculocutaneous nerve must be severed. At times it becomes expedient to section the saphenous nerve and rarely the sural (Fig. 12).

7. For varicose elephantiasis and for markedly indurated legs longitudinal incisions are preferred. For elephantiasis large elliptic segments of the skin, together with the underlying fat and fascia, may be removed from the medial aspect of the leg and three months later from the lateral side, thus diminishing the size of the leg, extirpating stagnant fluid-bearing fat and removing the fascial barrier between the superficial and deep compartments (Fig. 13).

8. In cases of osteomyelitis of the tibia, long after the bone has healed, there often remains a sizable ulcer over the lower part of the leg. It is due to regional stasis caused by multiple incisions and scars and to the extension of now abated infection into the subcutaneous tissue. Extirpation of the crural fascia from around the medial and anterior borders of the tibia will greatly improve the circulation of the skin and hasten the healing of the ulcer. When the bone is markedly thickened and inordinately wide in diameter a longitudinal strip may be sawed off from its medial border

to give the overlying skin a better substratum on which to survive.

9. Finally, there is the problem of stasis due to the lack of joint motion and muscular action. The condition is often seen after polyarthritis and in persons who have been subjected to prolonged recumbency and immobilization and then permitted to assume the upright position without supportive bandages. During their long illness and inactivity the muscles have atrophied and the joints of the lower extremity have become stiff. Crural fasciotomy will not benefit these patients so long as the joints remain ankylosed; muscles cannot contract and impart their beneficial squeezing action to the veins. Segmental ligation of the saphenous vein will convert a long stagnant column into several short ones, but so long as the muscles remain inactive stasis continues. One of the joints, preferably the knee, must be mobilized (Fig. 15).

RÉSUMÉ

Une discussion d'ulcères dus à la gravitation et aussi ceux dus aux autres etats est presentée, commanceant avec une description detailee des procédés pathologiques et aussi des procédés therapeutiques qui doivent etre employes: 1) ligature segmentaire des veines saphènes 2) compression des tissus 3) fasciotomie crurale. Plusieurs cas sont décrits, discutés et illustrés.

ZUSAMMENFASSUNG

Der Verfasser eroertert auf statischer Basis entstehende Unterschenkelgeschwuere und verwandte Zustaende. Er beginnt mit der Darstellung des allgemeinen chirurgisch-pathologischen Bildes und geht dann auf die Einzelheiten der Behandlung ein. Diese besteht aus drei verschiedenen ineinandergreifenden Verfahren: (1) segmentaere Unterbindung der Saphena, (2) Durchschneidung der Schenkelfaszie, (3) Druckverbaende.

Einige typische Faelle werden beschrieben und illustriert.

RIASSUNTO

Presenta una discussione di ulcere gravitazionali della gamba e stati alleati, principiando col quadro generale di patologia chirurgica e continuando le circostanze di conducimento. Il trattamento e composto di tre procedimento distinti, congiunti a coda di rondine; 1 legatura in semmento le vene safene, 2 fasciotomia crurale e 3 ovatte strette. Parecchi casi rappresentativi sono descritti ed illustrati.

REFERENCES

Bourgery, J. M.: Inconographia D'anatomia Chirurgica E Di Medicine Operatoria. Florence, 1841.

Hilton, J.: Rest and Pain. Reprinted from the last London edition. Garfield, P. W. Cincinnati and Cleveland: 1891, p. 144.

Scott, J.: Surgical Observations on the Treatment of Chronic Inflammation. London, 1828, pp. 1-105.

Growth and culture imply both activity and periods of leisure sufficient to absorb the results of this activity, using it to enrich art and manners and personality. The Athenians were quite right in believing that the final goods of life could not be achieved by anyone who was forced to spend the entire day in some spiritually deadening or physically exhausting task in the shop or on the farm; but it is equally true that the spiritual life itself suffers by complete divorce from the vivid experiences and the salutary restraints of practical activity.—*Lewis Mumford*

Chronic Arteriomesenteric Duodenal Ileus

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THE disease called chronic arteriomesenteric duodenal ileus is frequently referred to as Wilkie's syndrome. There are many examples of chronic duodenal ileus other than the arteriomesenteric; some congenital, some acquired. Examples of the congenital type are obstructions due to a congenital band and megaduodenum comparable to the megacolon of Hirschsprung's disease. Examples of the acquired type are obstructions due to adhesions, tuberculous glands and neoplasms. This paper, however, will be confined to arteriomesenteric ileus.

Rokitansky[1] in 1863 was the first to report a case of duodenal dilatation due to compression by the mesenteric root. It was not until 1907, however, that Bloodgood[2] in America suggested duodenojejunostomy for relief of the duodenal obstruction. A year later Stavely,[3] of Johns Hopkins, followed Bloodgood's suggestion and performed the first duodenojejunostomy for duodenal obstruction due to the mesenteric band. Wilkie[4] of Edinburgh in 1921 wrote extensively on the subject and in 1927[5] reported 64 cases in which the condition was treated by duodenojejunostomy. Since then numerous case reports and articles have appeared in the medical literature, but there is still considerable disagreement as to the etiology, incidence and surgical indications.

Incidence.—The incidence of this disease is difficult to estimate, but one can assume that the mild form occurs occasionally and the severe form rarely. The late Dr. Whitelaw, a roentgenologist of Vancouver, diagnosed Wilkie's syndrome twice in his last 1,000 roentgen examinations of the stomach and duodenum.

A survey of hospital records in Vancouver showed that approximately 1 patient has been operated upon in every two months. One surgeon has operated upon 12 and another on 8 since 1946. One of the senior abdominal surgeons, however, has operated upon only 6 in his thirty years of surgical practice, and another has never operated for this condition. I have operated upon 2 patients.

One suspects, however, that the mild forms of the disease are missed by clinicians and roentgenologists. Surgeons, even with the patient's abdomen open, may miss it occasionally unless they follow the teaching of Moynihan[6] that "every abdominal operation should include an examination of the third part of the duodenum."

Physiologic Features.—The physiologic movements of the duodenum are complex. When the acid chyme of the stomach enters the duodenum the first part of the duodenum contracts and the second and third parts undergo peristaltic, antiperistaltic and segmental movements. The contents of the duodenum are thereby churned back and forth a few times before being passed into the jejunum. Normal activity is easily upset, however, by disease intrinsic or extrinsic to the duodenum. Hyperperistalsis and sphincter-like spasms of the circular muscles result in a writhing action of the duodenum. This type of upset may be a result of vagatonia. On the other hand, increased dilatation and stasis may be due to sympatheticotonia. Some claim that such physiologic disturbances provide the etiologic basis of Wilkie's syndrome; that is, they claim that the syndrome is neuromuscular in origin.

In my opinion, however, no neuromuscular disturbance in the duodenum is ever the primary cause of Wilkie's syndrome. The primary etiologic factor is a mechanical obstruction. The duodenum responds to an obstruction similarly to any other segment of the gastrointestinal system. At first it compensates by increased peristalsis, segmental movement and dilatability. Later, when hyperactivity gives way to paresis and dilatation, it becomes decompensated.

Anatomic and Etiologic Elements.—The anatomic elements of the intestine and its mesenteries are well known, but several points

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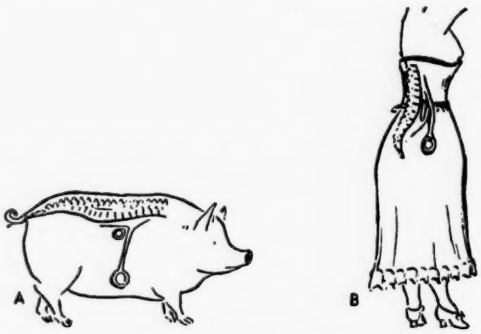

Fig. 1.—Sketch to differentiate conditions in the erect biped and the horizontal quadruped. In the human being the duodenum is vulnerable to compression by the mesenteric root; in the quadruped it is not. (*From Codman, E. A.: Chronic Obstruction of the Duodenum by the Root of Mesentery, Boston M. and S. J. 157:503, 1908.*)

of special interest are worth mentioning. The final stage in the embryologic rotation of the midgut fixes the horizontal part of the duodenum between the lumbar portion of the spine and the mesenteric root anteriorly. The mesenteric root or pedicle contains the superior mesenteric artery vein and nerve and crosses the horizontal or third part of the duodenum at its termination. The intermediate position of this part of duodenum renders it vulnerable to compression when for one reason or another the lumbar portion of the spine is prominent or the tension of the mesenteric pedicle is great.

It is of interest that the duodenum of the quadruped is not vulnerable to compression, because the drag of the intestine is ventral. In man, however, the drag is caudal in the erect position and ventral only when the all-fours or the knee-chest position is assumed.

Normally the mesentery of the small bowel has a broad posterior attachment, and the drag on the mesentery is therefore distributed over a broad base. Occasionally, however, the mesenteric attachment is poor and the drag of the small intestine is transferred to a narrow mesenteric pedicle. Occasionally, too, the right side of the colon lacks its posterior attachment, and its additional weight is added to the normal drag of the small intestine. A patient operated on at the Vancouver General Hospital in 1948, a woman aged 26, exhibited the anomalies just mentioned. At laparotomy the operating surgeon found no attachment of the small bowel mesentery to the posterior wall below the duodenum. The cecum and ascending colon had a mesentery and were excessively mobile. The drag of the small intestine and the right side of the colon rendered the mesenteric pedicle taut across the termination of the third part of the duodenum, and proximal to this the duodenum was tremendously dilated. The congenital anomaly of deficient mesenteric attachment is an exceptional cause of arteriomesenteric duodenal ileus, however, and must not be unduly stressed.

By far the commonest etiologic factor in the production of duodenal occlusion by the mesentric root is visceroptosis. In the presence of this condition the various ligaments and mesenteries become overstretched. In particular, the mesentery of the small intestine stretches to such an extent that the small intestine is prolapsed into the true pelvis. The mesenteric pedicle containing the artery vein and nerve, however, resists overstretching and becomes bandlike and taut. Usually, too, visceroptosis is associated with exaggerated lumbar lordosis, which predisposes still further to duodenal compression. At laparotomy the abnormal anatomic conditions are easily demonstrated. Traction on the mesentery for a moment is sufficient to dislodge the small intestine from the

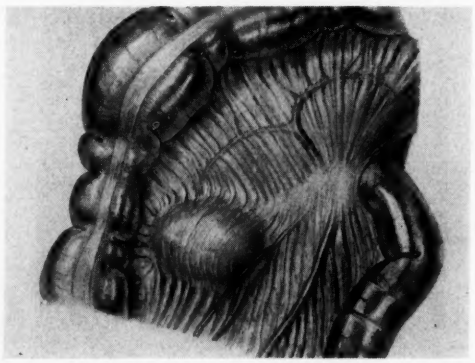

Fig. 2.—Artist's drawing. The dilated horizontal part of the duodenum presents as an oval mass when the transverse colon and the mesocolon are elevated. (*From Kellogg, E. L., and Kellogg, W. A.: Ann. Surg. 73:592, 1921.*)

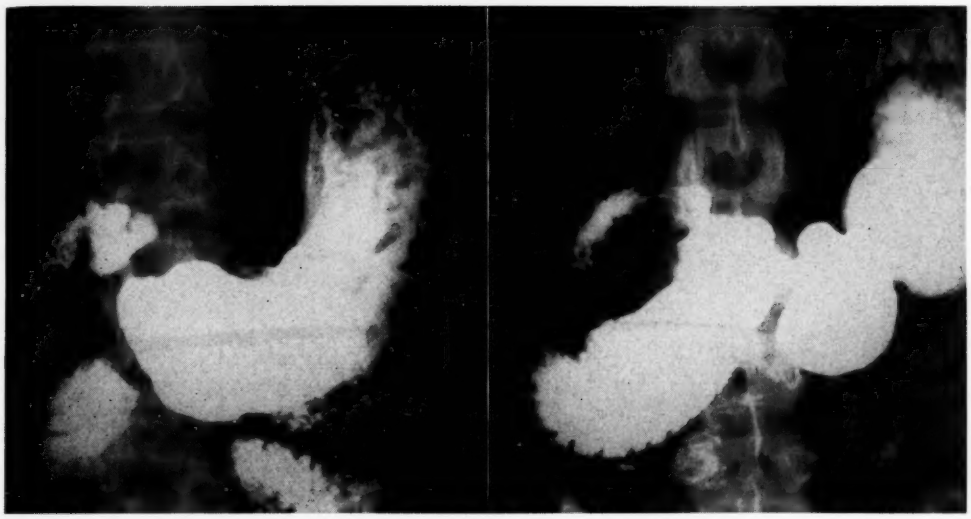

Fig. 3.—*Left,* roentgenogram showing a duodenum with increased dilatability in its horizontal part, just proximal to the mesenteric root. Under fluoroscopic examination there was a marked writhing action within the duodenum, and the duodenal contents were churned back and forth eight to ten times before being emptied into the jejunum. This is the commonest of all types and in the author's opinion should never be surgically treated. *Right,* roentgenogram showing a moderately advanced state of duodenal obstruction. The first and second parts of the duodenum appear normal, but the third part is greatly dilated and looks like an accessory stomach. Under these circumstances the emptying time is appreciably increased. This condition usually requires surgical intervention to relieve the obstruction, but a trial period of medical treatment, perhaps six months, should be instituted to establish the need of operation. *(From Graham, R. R.: Gastric and Duodenal Surgery. Appleton-Century, 1941, p. 596.)*

true pelvis, but continued traction causes the bowel to give with a pop as it leaves its resting place. Lifting the mesenteric band forward off a dilated and grooved duodenum allows it to empty.

Clinical Picture.—The clinical picture, without roentgen evidence, is never sufficiently clear-cut to make possible a diagnosis of chronic arteriomesenteric ileus. A suspicion of the presence of the disease, however, may be aroused by consideration of the history, the type of patient and the symptoms. The history invariably dates back many years, sometimes to childhood. It is essentially a record of attacks of indigestion and poor health alternating with periods of fairly good digestion and fairly good health. The type of person most commonly affected is the person of so-called habitus asthenicus, with poor nutrition, visceroptosis and lordosis. More often than not the patient is a woman between the ages of 30 and 40. The indigestion is of the postprandial gaseous type, characterized by bloating, belching, flatulence and a sense of fulness. Nausea and vomiting are common, as is pain, either aching or colicky. Typically the indigestion is relieved by the knee-chest posture or the left-prone position.

Chronic ileus of any degree of severity may become acute and completely obstructive during periods of special stress, as during pregnancy or after an operation. Patients hyperextended in the supine position for a fractured spine are ideal candidates for acute gastroduodenal dilatation.

Roentgen Data.—A roentgenologic consultation is essential to a positive diagnosis of duodenal obstruction due to the mesenteric band. Ideally the roentgenologist is informed of the clinical suspicion that this disease exists, in order that he may employ a technic designed to demonstrate duodenal ileus. Ideally, too, the roentgenologist receives the patient during an attack of dyspepsia; otherwise the duodenal

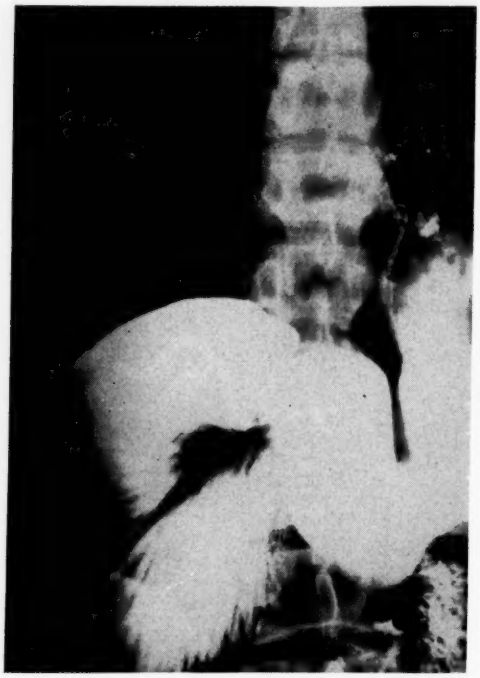

Fig. 4,—Roentgenogram demonstrating the advanced stage of Wilkie's syndrome. The pylorus is patulous, and the duodenum proximal to the mesenteric root is as large as the stomach. In such a case the delay in emptying is twelve hours. Surgical intervention is required to relieve the obstruction and should be undertaken as soon as the patient can be rendered fit.

structure and function associated with the milder types of this condition may appear normal. There are two important roentgen signs which are positive evidence of mesenteric duodenal ileus. One is delay in the emptying of the duodenum and the other is dilatation of the duodenum proximal to the point where the mesenteric pedicle crosses the termination of the horizontal part of this organ.

When the condition is advanced, the delay may be great. Bockus[7] reported a case with a forty-eight–hour delay and 2 cases with twenty-four–hour delay. The usual delay with the advanced condition is several hours, but with the moderately advanced type the delay is in terms of minutes and not hours. In the presence of the advanced condition the duodenum may be dilated to many times its normal diameter, and in many such cases the pylorus is patulous and the stomach dilated. The usual duodenal dilatation in cases of the moderately advanced condition is to twice the normal size. If both stasis and dilatation are marked, the roentgen diagnosis is easily made. There are many cases of mild involvement, however, in which the stasis is in terms of seconds and not minutes or hours, and the dilatation is rather an increase in dilatability. The most significant feature in these cases is the so-called writhing action within the duodenum.

Diagnosis.—The diagnosis of chronic arteriomesenteric duodenal ileus is to some extent arrived at by exclusion. Peptic ulceration, cholecystitis and chronic appendicitis must be ruled out. The first step in positive diagnosis of chronic arteriomesenteric ileus is the roentgen demonstration of a significant amount of stasis, dilatability, dilatation or writhing action in the duodenum. The second step is proof that the demonstrable duodenal obstruction is due to the mesenteric root and not to a congenital band, an adhesion or a neoplasm. When other disease can be excluded and the roentgen evidence is positive, then the history, the type of patient and the symptoms must be considered. All evidence being positive, a diagnosis of chronic arteriomesenteric duodenal ileus can be made with assurance.

The diagnosis, however, should be qualified by some term denoting the severity of the disease. Is it mild, moderate or advanced? The mild condition is that in which physiologic compensation for the obstruction is present. The moderate condition is associated with incipient decompensation. Hyperactivity is giving way to paresis and dilatation. Delay in emptying is moderate. In the advanced condition, marked decompensation is present. Paresis, dilatation and delay in emptying are well advanced.

Figure 4 shows a duodenum which exhibited an increased dilatability in its horizontal part, just proximal to the mesenteric root. Under fluoroscopic examination there was a marked writhing action within the duodenum, and the duodenal contents were churned back and forth eight to ten times before being emptied into the jejunum. This is the commonest of all types and, in my opinion, should never be submitted to operation.

Figure 5 demonstrates a moderately ad-

vanced state of duodenal obstruction. The first and second parts of the duodenum appear normal, but the third part is greatly dilated and looks like an accessory stomach. Under these circumstances the emptying time is appreciably increased. This type of involvement usually requires surgical intervention to relieve the obstruction, but a trial period of medical treatment, perhaps for six months, should be instituted to establish beyond doubt the need of operation.

Figure 6 demonstrates the advanced stage of Wilkie's syndrome. The pylorus is patulous, and the duodenum proximal to the mesenteric root is as large as the stomach. The delay in emptying is twelve hours. This condition requires operation to relieve the obstruction just as soon as the patient can be rendered fit to undergo it.

Treatment.—Medical treatment is the therapy of choice in all cases of mild arteriomesenteric duodenal ileus. Since the condition is assumed to be a complication of visceroptosis, treatment is directed mainly toward correction of this condition. Physiotherapy, abdominal support and attention to malnutrition do much to alleviate visceroptosis. Assumption of the knee-chest position at intervals after each meal is of great assistance. Patients with moderate involvement may require operation, but a trial period of medical treatment, perhaps for six months, should be instituted to establish the fact. Patients with the advanced condition must be treated surgically, but some may require considerable preoperative care to render them fit for surgical treatment.

At laparotomy the operating surgeon performs a thorough exploration and demonstrates obstruction of the third part of the duodenum by the mesenteric root.

The corrective operation is a straightforward procedure that short-circuits the obstruction. The transverse portion of the colon is drawn through the incision and elevated. The bulging third part of the duodenum is exposed. The peritoneum over it is incised, and the duodenum is thoroughly mobilized. The first loop of the jejunum some 6 to 8 inches (15.2 to 20.3 cm.) from the duodenojejunal flexure is then anastomosed to the mobilized duodenum in a retroperistaltic manner.

On completion of the operation the edges of the incised peritoneum are sutured to the duodenum so as to keep the anastomosis within the peritoneal cavity. Occasionally the presence of cholecystitis or a peptic ulcer makes an additional operation necessary.

Postoperative care is conducted along the same lines as for gastrojejunostomy.

Prognosis.—The prognosis of Wilkie's syndrome in its mild forms, treated medically, is quite good. The prognosis of the moderate forms, however, depends upon the wisdom shown in selecting the form of therapy. The prognosis of advanced Wilkie's syndrome treated surgically is good unless concomitant disease counteracts an otherwise favorable surgical result.

SUMMARY

1. The mild form of chronic arteriomesenteric duodenal ileus occurs occasionally and the severe form rarely. Approximately 1 patient every two months is operated upon in the city of Vancouver.

2. The disease in a great majority of cases is a complication of visceroptosis; occasionally, however, it is a complication of a congenital anomaly, such as a poor mesenteric attachment. Obstruction of the duodenum is brought about by a taut arteriomesenteric band compressing the termination of its horizontal part.

3. The diagnosis is suggested by the history, the type of patient and the symptoms,

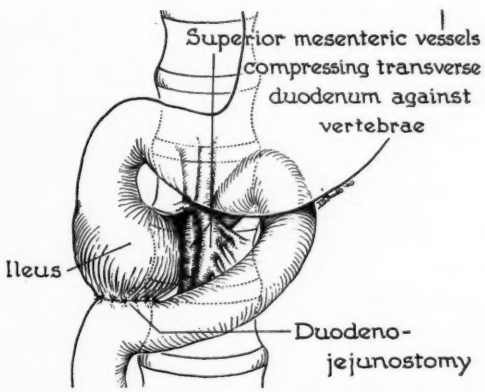

Fig. 5.—From a paper published by Roscoe R. Graham in 1941.

but roentgen evidence is essential to the diagnosis. Positive roentgen evidences of obstruction are excessive retroperistalsis, stasis, excessive dilatability and dilatation proximal to the point where the mesenteric root crosses the duodenum. It should be determined whether the disease is mild, moderate or advanced.

4. The treatment of the mild condition is medical. The moderate type is given a trial of medical treatment before surgical intervention is decided upon. The advanced condition is best treated surgically. Laparotomy should be performed, with a thorough exploration, the establishment of a duodenojejunostomy and the occasional addition of surgical procedures directed towards the cure of concomitant disease, such as peptic ulceration or cholecystitis.

5. The prognosis of chronic arteriomesenteric duodenal ileus is, as a rule, favorable if, proper treatment is given.

RÉSUMÉ

1. La forme légère de l'iléus duodénal arterio-m mésenterique chronique survient parfois. La forme chronique est plus rare. Un malade est opéré tous les deux mois pour cet état dans la ville de Vancouver.

2. La maladie dans la grande majorité des cas est un une complication de la viscéroptose; parfois c'est une complication d'une anomalie congénitale, tel qu'un attachment mésentérique trop restreint. L'obstruction du duodénum est determiné par une bande arteriomesentérique trop serré qui comprime la terminaison de la partie horizontale du duodénum.

3. Le diagnostic est suggéré par l'histoire, le type du malade et les symptômes; mais neanmoins, l'evidence roentgenlogique est essentielle pour le diagnostic. Les témoignages positifs sont le retroperistaltisme excessif, la stase, la dilatibilité excessive et la dilatation proximale au point ou les racines mésenteriques compriment le doudenum. Il faut déterminer si la maladie est légère, modérée ou avanceé.

4. Pour les obstructions légères, on emploiera le traitement médical. Pour le type modéré, on essai era avec le traitement médical avant d'intervenir chirurgicalement. Pour les cas avancés, on fera une laparotomie, on explorera l'abdomen, on créera une duodénojéjunostomie, on ajoustera toute mesure churgicale ayant pour but la guérison de maladie concomitante, telle qu'ulcère peptique, cholecystite etc.

5. Le pronostique de l'ileus dû a l'arteriomesenterique chronique duodénal, est favorable si on emploi le traitement approprié.

ZUSAMMENFASSUNG

1. Der chronische arteiomesenterische Zwoelffingerdarmileus kommt in seiner leichten Form gelegentlich und in seiner schweren Form selten vor. In der Stadt Vancouver gelangt etwa alle zyei Monate ein Kranker zur Operation.

2. In der grossen Mehrzahl der Faelle stellt die Erkrankung eine Komplikation einer Visceroptose dar. Gelegentlich aber tritt sie als Komplikation einer angeborenen Anomalie wie zum Beispiel einer unzureichenden mesenterialen Befestigung auf. Zur Abklemmung des Zwoelffingerdarms kommt es durch Druck eines straffen arteriomesenterialen Bandes auf das Ende des horizontalen Duodenalabschnittes.

3. Die Diagnose wird durch die Krankheitsgeschichte, den Typus des Patienten und die Symptome angedeutet, aber der Roentgennachweis ist wesentlich zur Erkennung der Krankheit. Positive Roentgenzeichen der Obstruktion sind: uebermaessige ruecklaeufige Peristaltik, Stase, aussergewoehnliche Dehnbarkeit und Erweiterung oral von der Stelle, wo die Mesenterialwurzel den Zwoelffingerdarm kreuzt. Es sollte festgestellt werden, ob ein leichter, maessiger oder vorgeschrittener Krankheitsfall vorliegt.

4. Die leichen Faelle werden medizinisch behandelt. Der maessig schwere Typus wird erst einem Versuch medizinischer Behandlung unterzogen, ehe man sich zum chirurgischen Eingriff entschliesst. Fuer die schweren Faelle ist die chirurgische Behandlung die beste. Es sollte eine Laparotomie mit sorgfaeltiger Explorierung und eine Duodenojejunostomose ausgefuehrt und gelegentlich zusaetzliche chirurgische Eingriffe vorgenommen werden, um Begleiterkrankungen wie peptische Geschwuere oder Gallenblasenentzuendungen zu beseitigen.

5. Die Prognose des chronischen arterio-

mesenterialen Zwoelffingerdarmverschlusses ist, wenn geeignete Behandlung erfolgt, in der Regel guenstig.

RESUMEN

1. La forma benigna del íleo duodenal arteriomesentérico ocurre ocasionalmente y la forma grave raramente. En la ciudad de Vancouver se opera un paciente cada dos meses aproximadamente.

2. La enfermedad es en gran mayoría de casos complicación de visceroptosis, pero ocasionalmente es complicación de una anomalía congénita, como una deficiente inserción mesentérica. La obstrucción duodenal se produce por una brida arteriomesentérica que comprime reiteradamente la terminación de su parte horizontal.

3. El diagnóstico se hace por antecedentes, tipo del paciente y sintomatología, pero la evidencia röntgen es esencial para el mismo. Evidencias röntgen positivas de obstrucción son retroperistaltismo excesivo, estasis, dilatabilidad excesiva y dilatación proximal al punto en que la raíz mesentérica cruza el duodeno. En virtud de esto se determina si la enfermedad es benigna, moderada o avanzada.

4. El tratamiento del estado benigno es médico. El tipo moderado debe tratarse médicamente antes de decidir la intervención quirúrgica. El estado avanzado es mejor tratarlo quirúrgicamente. Debe efectuarse laparotomía, exploración completa, duodenoyeyunostomía y la adición ocasional de procedimientos quirúrgicos para el tratamiento de enfermedad concomitante, como úlcera péptica o colecistitis.

5. Si se hace tratamiento adecuado es generalmente favorable el pronóstico del íleo duodenal arteriomesentérico.

RIASSUNTO

1. La forma soave cronica d'ileo duodenale arteriomesenterico occorre occasionalmente, quella severa raramente. Approssivatamente I paziente ogni due mesi é operato nella città di Vancouver.

2. La malattia nella maggioranza dei casi à una complicazione di visceroptosi occasionalmente, intanto, di anomalo congenito, tale che un attaccamento indigente mesenterico. Ostruzione del duodeno si compiere presso d'una striscia stretta ristringendo la limite della parte orizzontale.

3. La diagnosi é suggerite nella maggioranza dei casi dalla storia, il tipo di paziente ed i sintomi, ma l'evidenza dei raggi X é essenziale per la diagnosi. Prova assoluta dimostrata dai raggi X del imbarazzo sono retroperistalsi, stasi, dilatabilità e dilatazione eccessivo prossima la punta del traverso della radice mesenterico al duodeno. Si determina che la malattia sia indulgente moderata od avanzata.

4. Il trattamento della condizione debole e'medicale. Al tipo moderato si da un saggio medicale prima del intervento chirurgico sia deciso. Il miggliore trattmento per la condizione avanzata é la chirurgia. Effettuare laparatomia con esplorazione intero, lo stabilimento del duodenodigi unostomia e casualmente aggiungere un modo di procedere diretto alla cura delle malattie concomitanti simile al ulcerazione peptico e oppure colecistite.

5. La prognosi d'ileo duodenale arteriomesenterico cronica come regola e favorevole dato trattamento corretto.

REFERENCES

1. Rokitansky: Lehrbuch der Pathol. Anatomie, 3d ed., Vol. 3, 1863.
2. Bloodgood, J. C.: Gastromesenterie Ileus, Ann. Surg. **46**: 736, 1907.
3. Stavely: Bull. Johns Hopkins Hosp. **19**:252, 1908.
4. Wilkie, D. P. D.: Brit. J. Surg. **19**:204, 1921.
5. Wilkie, D. P. D.: Am. J. Med. Sc. **173**:647, 1927.
6. Moynihan, B.: Abdominal Operations. Philadelphia: W. B. Saunders Company, 1926. Vol. 1, p. 443.
7. Bockus, H. L.: Gastroenterology. Philadelphia: W. B. Saunders Company, 1944. Vol. 2, p. 66.

Lipoma of the Colon Simulating Carcinoma

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PHILADELPHIA

ALTHOUGH once considered a clinical and pathologic oddity, lipomas of the colon are comparatively common, occurring next in frequency to benign adenomas. Bauer,[1] in 1757, was the first to record accounts of lipomas of the gastrointestinal tract. Hiller,[2] in 1899, studied a series of 23 cases, and since that time there have been numerous reports in the literature. Stetten,[3] in 1909, cited 72 cases of gastrointestinal lipoma, in 32 of which the lesions were in the colon, while Comfort,[4] in 1931, presented 28 additional cases, making a total of 181 up to that time; 92 lipomas were in the colon, 65 in the small bowel and 22 in the stomach. Poston,[5] in 1934, brought the total number of cases to 242, while Schottenfeld,[6] in 1943, added 6 cases of his own, increasing the total number of reported clinical and necropsy cases to 275; of these, 121 were cases of lipoma of the colon.

Incidence.—With regard to the colon itself, several noteworthy contributions have been made. Pemberton and McCormack[7] analyzed 97 clinical cases in which symptoms had been produced by the tumor. They stated that "excluding adenomatous polyps, lipomas are the most common tumors of the gastrointestinal tract." Gault and Kaplan[8] presented 14 instances of colonic lipoma and stated as follows: "Benign tumors of the colon are comparatively rare. Of these, lipoma is the second most common tumor." Browne and McHardy,[9] in 1944, reported 5 examples of their own and listed 130 from the English literature. Runyeon,[10] in 1946, added 2 cases and reviewed 121 satisfactorily studied clinical ones, while Pack and Booher,[11] one year later, gathered 153 cases of submucous lipoma of the large intestine from the literature and contributed 2 of their own. Long, Dockerty and Waugh[12] found 33 instances of lipoma of the large bowel in a survey of 125,000 laparotomies and stated that, since these were all clinical cases, their survey probably represented a concise account of the actual frequency of these tumors in surgical practice. Mayo and Griess[13] in 1949 reported 19 cases, bringing to 43 the number of operations performed for this condition. Comfort[4] found that in a study of 3,924 necropsies the incidence of lipoma of the colon was 0.5 per cent, while Kirschbaum[14] detected an incidence of 0.2 per cent in 5,724 clinical examinations, indicating that many lipomas may be silent. Comparing this percentage to data on adenomas, Saint[15] discovered only 2 lipomas in contrast to 36 adenomatous polyps in a series of 44 benign polypoid lesions of the colon.

Location.—The previous studies have indicated that lipomas are more frequent in the colon than anywhere else in the gastrointestinal tract. With regard to the different portions of the large intestine involved, in order of frequency, these tumors are found in the cecum, the ascending colon and the sigmoid colon, about 50 per cent occurring in the right half of the colon.[16] Boyd[17] stated that the predominant ileocecal frequency is due to the local inflammation and irritation so common in this region. Pemberton and McCormack,[7] in 102 cases, observed 29 lipomas in the cecum, 21 in the ascending colon, 15 in the transverse colon, 14 in the sigmoid flexure, 12 in the rectum and 11 in the descending colon. Runyeon,[10] in 109 instances in which definite localization was possible, found 51, or 46 per cent, in the cecum and ascending colon, an approximate length of 25 cm.; 17, or 16 per cent, in the transverse colon, measuring 50 cm., and 41, or 38 per cent, in the left half of the colon, a distance of 85 cm. This study shows lipoma of the right half of the colon to have a relative incidence of six times that of the same tumor in the transverse portion of the colon and four times its incidence in the left half.

Pathogenesis.—The etiologic background of intestinal lipoma is still unsettled. As has been mentioned, Boyd[17] has stated that inflammation and irritation may play a role, especially in the ileocecal region. Other theories have been advanced. Minelli[18] expressed the opinion

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TABLE 1 *(Runyeon).—Procedures for Removal of Lipoma of Colon*

Location	Anal removal	Spontaneous passage	Colostomy Resection	Colotomy Excision Closure	Resection	Colostomy	Total
Rectum	10	2	1	0	0	0	13
Sigmoid	3	2	0	2	6	1	14
Descending colon	2	0	0	4	7	1	14
Transverse colon	0	1	0	4	12	0	17
Ascending colon	0	0	0	4	15	0	19
Cecum	0	0	0	14	18	0	32
Presumably colon	1	7	0	0	1	0	9
Total	16	12	1	28	59	2	118

that these tumors are the result of degenerated connective tissue, while Cicala[19] suggested that they arise as a result of perivascular infiltration in the fibruos trabeculae. On the other hand, Alevoli[20] concluded that a deposit of fatty tissue results from maldevelopment in the lymphatic supply and muscular circulation of the tissues, whereas Borst[21] considered lipomas the consequence of metaplasia of common connective tissue into the adipose variety. Geschickter[22] stressed the association of lipoid tissue with lymphatic tissue, pointing out that the distribution of many benign solitary lipomas in the interscapular region corresponds to a peculiar mass observed in the embryo, composed of vascular lymphoid tissue and containing many fat cells. In other regions of the body this same association apparently occurs, and he concluded that lipomatous tumors in general probably follow the same distribution as lymphatic cysts. He further stated that both lymphoid and lipomatous tissue develop late in the course of evolution and late in embryonic life, the transformation from connective tissue to xantholipoma to fat occurring after the sixth month and being very active just before birth. In addition, he expressed the opinion that the further development of fat in later life is under hormonal influence, which is variable but probably derived from more than one source, the chief of which are the anterior lobe of the pituitary gland, the sex glands of internal secretion, and a related chorionic hormonal substance, "prolan," present in the urine of pregnancy. Concerning the pathogenesis of these tumors, Long and his co-workers[12] stated that there is good evidence that adipose tissue is not merely connective tissue containing fat but is a part of the reticuloendothelial system and is a specialized organ. They pointed out, as others have done, that lipomas appear to spring from deposits of adipose connective tissue in the submucous and subserous zones of the colon.

Pathologic Picture.—Histologically, lipomas are well differentiated benign tumors composed of adult fat cells enclosed in a capsule. In the colon they are of two types, submucous (90 per cent) and subserous (10 per cent). They usually occur singly but may be multiple, and the two kinds may be found together. Comfort[4] observed 7 cases of combined lesions and 13 of multiple tumors, the latter as a rule being of the submucosal variety. The subserosal tumor generally arises from the appendices epiploicae and may attain huge proportions before it produces symptoms. The submucosal kind, on the other hand, arises when a cluster of fat cells or a minute lipoma herniates along with the submucosa into an infolding of the mucosa. They may be sessile or pedunculated and vary in size from microscopic collections of fat cells to large polyps. However, this variety rarely attains a large size, owing to the symptoms produced by obstruction to the lumen. Comfort[4] found that the symptomatic tumors averaged about 8 cm. in diameter. Pedunculated growths are the result of peristalsis and the irritation of the passing intestinal content, and the well developed ones are covered by a thin atrophic mucosa with a barely perceptible muscularis mucosae.

Complications and Symptoms.—Submucosal lipomas commonly produce complications, the chief of which are irregular and forceful peristalsis, obstruction, ulceration and intussusceptions.

tion. They may undergo spontaneous expulsion or circulatory changes resulting in edema, hemorrhage, cystic degeneration, necrosis, ulceration or sloughing. Comfort[4] and Pemberton and McCormack[7] reported a 50 per cent incidence of intussusception. Manheim and Peskin[23] observed 20 cases of spontaneous expulsion of intestinal lipomas. The subserous variety, on the other hand, produces complications by direct compression or, if pedunculated, by traction on the pedicle.

The symptoms of colonic lipomas are variable, and there is no specific clinical picture. The size, location and behavior of the tumor determine the time of onset of the symptoms, which are secondary to the complications mentioned above: namely, disordered peristalsis, obstruction, intussusception, ulceration and circulatory injury. The symptoms, therefore, are simply those encountered in the presence of any colonic tumor, benign or malignant. Long and his collaborators[12] and Pemberton and McCormack[7] noted an average duration of thirty-eight and four tenths and forty-one and five tenths months respectively, while one of us (H. E. B.) has reported an average of nine and three-tenths months in cases of malignant colonic disease.[24] Browne and McHardy[9] recorded an incidence of pain in 75.2 per cent of cases, a palpable tumor in 74.2 per cent, constipation in 55.4 per cent, weight loss in 14.6 per cent and bleeding sufficient to produce anemia in 7.9 per cent. However, the profound anemia associated with carcinoma of the cecum has not been observed. Diarrhea or constipation alternating with diarrhea may occur. With regard to location, Comfort[4] detected symptoms in 75 per cent of cecal lesions; 79 per cent of those in the ascending colon, and 90 per cent of those occurring in the transverse and sigmoid portions of the colon. In this respect, Browne and McHardy[9] stated: "Statistically at least, with pain and a mass in approximately 75 per cent of cases, with the lesion most often in the right colon, with long duration yet without anemia, we should in most instances venture a diagnosis of benign lesion."

Diagnosis.—A positive preoperative diagnosis of colonic lipoma is seldom made. In the series reported by Long and his associates,[12] a specific diagnosis of lipoma was made only once, although in 2 cases the roentgenologic report mentioned the likelihood. As a rule it is not possible for the roentgenologist to distinguish between the various histologic types of benign polypoid neoplasms. However, Weber[25] has pointed out that adipose tissue is the most radiolucent of all body tissues and has suggested that a polyp which fails to manifest the usual density on pneumograms may be a lipoma. On the other hand, as was stated by Browne and McHardy,[9] "actually it is more likely that the findings will lead to a diagnosis of carcinoma of the colon." In Long's series[12] a diagnosis of "polypoid lesion," "intussusceptting lesion," or just "lesion" of the specific part of the large bowel was made in 10 cases, while in 14 cases the roentgenologic diagnosis was carcinoma of the colon.

Proctoscopic examination may reveal the presence of a single pedunculated mass that appears yellowish and smooth, soft and superficially ulcerated. However, changes secondary to vascular disturbance frequently alter the appearance of the lesion, and a correct diagnosis is usually not made except at operation. Of course, positive results of a biopsy at proctoscopic investigation would be conclusive, but Browne and McHardy[9] did not encounter a single such lesion in 6,570 consecutive examinations, in which 66 carcinomatous and 108 adenomatous polyps were observed.

Treatment.—The treatment of colonic lipoma is surgical. Browne and McHardy[9] stated: "Since submucous lipomas in the colon do not manifest themselves in any specific fashion and though histologically benign, they are not clinically so when they become symptomatic nor in their potentialities even though asymptomatic, the only therapeutic approach is surgical." If, on exploration, inspection and palpation give indications of a benign tumor, colotomy with incision, enucleation and suture may be done if the growth is confined to the wall; or, if it is pedunculated, simple excision and ligation of the base may be employed. However, since the exact nature of the lesion is often difficult to determine, segmental resection with primary anastomosis is the procedure usually advocated, provided, of course, that the bowel has been properly prepared and

that obstruction is not present. In these events a staged procedure may be required, with a proximal colostomy or a modified Mikulicz type of operation. Runyeon,[10] in his series of collected cases, has outlined the procedures employed for removal of lipomas from the colon (see Table 1).

In Long's group,[12] a right colectomy was done in 15 cases, in 6 of which the lipoma was associated with a carcinoma; exteriorization operations were performed in 8 cases; transcolonic removal in 5 cases; resection with primary anastomosis in 3; and combined abdominoperineal resection in 2, both times for carcinoma, the lipoma being incidental.

REPORT OF CASE

C. S., a 77-year-old white man, was admitted to Temple University Hospital on July 18, 1950, complaining of dizziness, high blood pressure and a rectal abscess. He stated that for about two years he had suffered from transient dizzy spells and had had hypertension for many years. He had noted a clear discharge from the left ischiorectal region intermittently for twenty years. His breasts had been large for several years but had increased noticeably in size during the past two years. For the past ten months he had complained of a vague aching pain in the right lower quadrant of the abdomen. He had had no rectal bleeding or change in bowel habit. The past medical history and family history were noncontributory.

Physical examination revealed the patient to be obese, with a blood pressure of 176 systolic and 100 diastolic. There was bilateral gynecomastia, the right breast being larger than the left, with a suggestion of a freely movable, encapsulated, nontender mass within the breast tissue. No axillary nodes were palpable. The remainder of the examination gave essentially negative results except for some pallor of the mucous membranes and a fistula-in-ano with a chronic ischiorectal abscess on the left side. No masses were felt in the abdomen.

Laboratory studies revealed a hemoglobin level of 10.2 Gm., an erythrocyte count of 3,800,000 per cubic millimeter of blood and a color index of 0.87. The stools gave a moderately positive reaction for occult blood. An electrocardiogram showed evidence of myocardial disease with right bundle branch block.

Proctosigmoidoscopic investigation to a distance of 22 cm. gave essentially negative results. An upper gastrointestinal series revealed nothing significant. Because of the unexplained secondary anemia, occult blood in the stool and the history of vague right lower quadrant pain, a barium enema with air-contrast studies was carried out and reported as follows: "With the aid of the Bardex catheter, the barium enema was administered under fluoroscopic control. There was no obstruction to the retrograde flow of the barium mixture and all parts of the colon and a portion of the terminal ileum were filled. The sigmoid, transverse and descending portions of the colon show smooth margins and normal haustral pattern. On the lateral margin of the midportion of the ascending colon we note a smooth spherical filling defect which measures about 4 by 3 cm. This filling defect is rather well demarcated on the air contrast studies, where the lesion has the appearance of an adenoma with a broad base (Fig. 1). Evacuation of the enema is satisfactory, and again we note the appearance of a spherical pressure defect of the barium mixture in the midportion of the ascending colon, due to the previously described tumor mass. Conclusions: The significant finding in this barium enema study is the presence of a filling defect in the midportion of the ascending colon which has the appearance of an adenoma. Malignancy must definitely be considered, especially in view of the marked anemia."

Fig. 1.—Polypoid filling defect visualized in midpart of ascending colon on double-contrast film. The relative radiolucency of the tumor is noted.

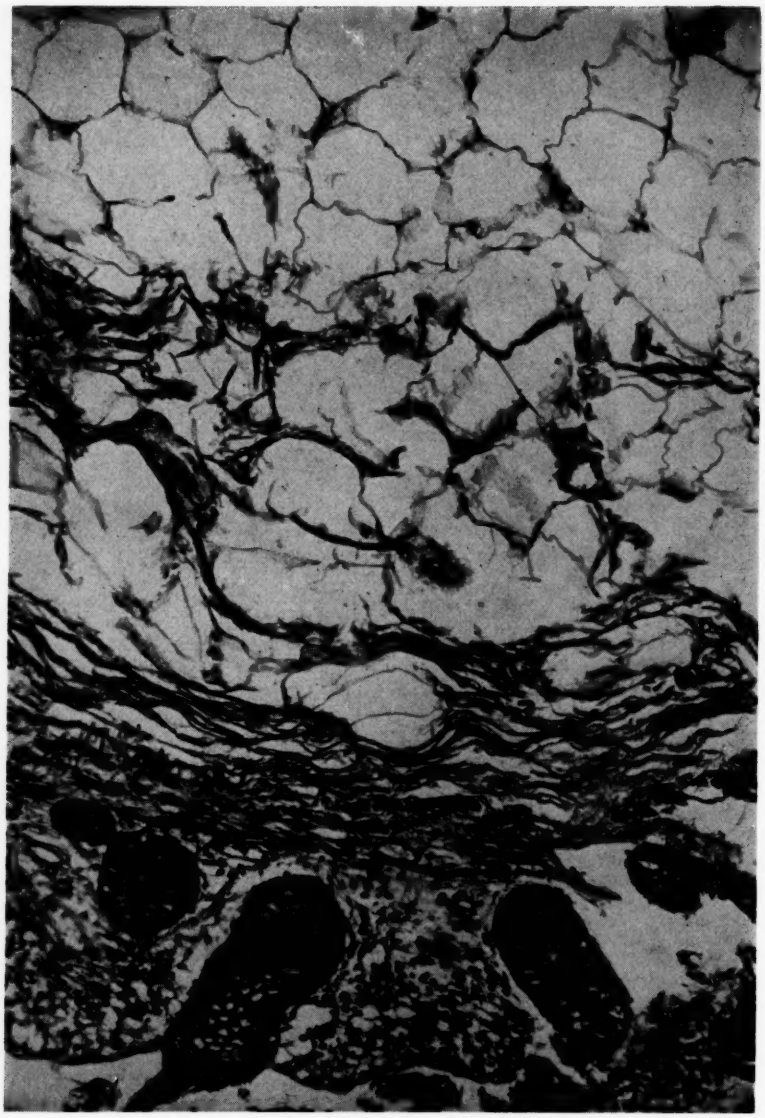

Fig. 2.—Section showing adult fat cells beneath a thin layer of mucosa and muscularis mucosae.

The patient was therefore operated upon, after due preparation of the colon, with a preoperative diagnosis of polypoid lesion of the ascending colon. At exploration, the right colon was mobilized and a soft, freely movable mass about the size of a walnut was palpated in the midpart of the ascending colon. It appeared to be attached only to the mucosa and could be moved proximally and distally for a distance of several centimeters. Consequently an incision was made in the bowel and a soft

smooth, yellowish, pedunculated tumor mass was delivered. As the pedicle was long, the lesion was removed by simple division and ligation of the base.

The pathologic report was as follows: "The specimen consists of a well circumscribed fatty mass 3.2 cm. in diameter, attached to a pedicle. The sections show a neoplasm consisting of adult fat. The bowel mucosa is stretched over one surface. Diagnosis: Lipoma of the colon" (Fig. 2).

SUMMARY AND CONCLUSIONS

1. A case of lipoma of the ascending colon associated with bilateral gynecomastia is reported.

2. Lipoma of the large intestine is second in frequency only to adenoma and should be considered in the differential diagnosis of tumors involving the colon.

3. The etiologic, pathologic and symptomatologic aspects of colonic lipoma are discussed.

4. Lipomas occur most frequently in the cecum and ascending colon and may simulate carcinoma. Secondary anemia of unexplained origin should direct one's attention to the proximal portion of the colon, though our patient did not present the profound anemia associated with malignant change involving this region.

5. Patients with vague gastrointestinal complaints should undergo careful roentgenologic investigation, as many lesions in the right side of the colon may be relatively asymptomatic.

RÉSUMÉ

1. Un cas de lipome du colon ascendant associé avec gynécomastie bilatérale est rapporté.

2. Le lipome du gros intestin est second en fréquence seulement à l'adénome et doit être considéré dans le diagnostic différentiel des tumeurs intéressant le colon.

3. L'etiologie, la pathologie et les symptômatologies du lipome du colon sont discutées.

4. Le lipome survient le plus fréquemment dans le colon ascendant et peut simuler le carcinome. L'anemie secondaire d'origine inconnue doit diriger l'attention à la portion proximale du côlon, quoique le malade dont nous rapportons le cas ne presentait pas la profonde anémie généralement associeé aux tumeurs malignes de cette région.

5. Les malades se plaignant de troubles gastriques intestinaux très vagues devraient être examinés aux rayons X, car beaucoup de lesions du côte droit du côlon sont relativement asymptomatiques.

RIASSUNTO

1. Descrive un caso di lipoma del colon associato con ginecomastia bilaterale.

2. Lipoma del intestino grosso e' secondo in frequenza solo ad adenoma e dovrebbe essere considerato nella diagnosi differenziale dei tumori abbracciando il colon.

3. Discute l'aspetto etiologico, patologico e sintomatologico.

4. Lipoma si presenta piu frequentemente nel cieco e colon ascendente e puo simulare carcinoma. Anemia secondaria d'origine inesplicato dovrebbe dirigere l'attenzione alla porzione prossima del colon, sebbene il paziente qui riportato non ebbe l'anemia profondo generalmente associata col cambio maligno in questa regione.

5. Pazienti con doglianza gastrointestinale vaghe, dovrebbero tollerare investigazione radiologica vigilante, siccome diversi lesioni nel lato destro del colon possono essere relativamente asintomatiche.

ZUSAMMENFASSUNG UND SCHLUSSFOLGERUNGEN

1. Es wird ein Fall von Lipom des aufsteigenden Dickdarms bei gleichzeitig bestehender doppelseitiger Gynaekomastie beschrieben.

2. Lipome des Dickdarms folgen in Haeufigkeit unmittelbar dem Adenom und sollten bei der Differenzialdiagnose der Dickdarmgeschwuelste in Betracht gezogen werden.

3. Aetiologische, pathologische und symptomatologische Aspekte der Dickdarmlipome werden eroertert.

4. Das Lipom tritt am haeufigsten im Zoekum und im aufsteigenden Dickdarm auf und kann aehnlich wie ein Karzinom aussehen. Eine sekundaere Blutarmut unerklaerten Ursprungs sollte die Aufmerksamkeit auf den proximalen Abschnitt des Dickdarms lenken, wenn auch in dem hier beschriebenen Falle der Kranke keine schwere Blutarmut, wie sie im allgemeinen bei boesartigen Veraenderungen in dieser Gegend auftritt, aufzuweisen hatte.

5. Kranke mit unklaren Magendarmbeschwerden sollten einer sorgfaeltigen Roentgenuntersuchung unterzogen werden, da viele Veraenderungen in der rechten Dickdarmhaelfte verhaeltnismaessig symptomlos verlaufen koennen.

REFERENCES

1. Bauer, cited by Schottenfeld, L. E.: Lipomas of the Gastrointestinal Tract, with Special Reference to the Small Intestine Including the Ileum: Review of the Literature and Report of Six Cases, Surgery **14**: 47, 1943.
2. Hiller, T.: Cited by Stetten.[3]
3. Stetten, D.: The Submucous Lipoma of the Gastrointestinal Tract: Report of Two Successfully Operated Cases and Analysis of the Literature, Surg., Gynec. & Obst. **9**:156, 1909.
4. Comfort, M. W.: Submucous Lipomata of the Gastrointestinal Tract, Surg., Gynec. & Obst. **52**:101, 1931.
5. Poston, R. I.: Acute Enteric Intussusception in an Adult Caused by Lipoma, with a Survey of the Literature, Brit. J. Surg. **22**:108, 1934.
6. Schottenfeld, L. E.: Lipomas of the Gastrointestinal Tract, with Special Reference to the Small Intestine Including the Ileum; Review of the Literature and Report of Six Cases, Surgery **14**:47, 1943.
7. Pemberton, J. de J., and McCormack, C. J.: Submucous Lipomas of Colon and Rectum, Am. J. Surg. **37**:205, 1937.
8. Gault, J. T., and Kaplan, P.: Submucous Lipoma of the Colon; Report of a Case, Am. J. Surg. **53**:145, 1941.
9. Browne, D. C., and McHardy, G.: Submucosal Colon Lipomas, Clinics **3**:622, 1944.
10. Runyeon, F. G.: Submucous Lipoma of the Colon, New York State J. Med. **46**:2272, 1946.
11. Pack, G. T., and Booher, R. J.: Intussuscepting Submucous Lipoma of Right Colon, Surg. Clin. North America **27**:361, 1947.
12. Long, G. C.; Dockerty, M. B., and Waugh, J. M.: Lipoma of the Colon, Surg. Clin. North America **29**:1233, 1949.
13. Mayo, C. W., and Griess, D. F.: Submucous Lipoma of the Colon, Surg., Gynec. & Obst. **88**:309, 1949.
14. Kirschbaum, J. D.: Submucous Lipomas of the Intestinal Tract as a Cause of Intestinal Obstruction, Ann. Surg. **101**:734, 1935.
15. Saint, J. H.: Polypi of the Intestine: with Special Reference to the Adenomata, Brit. J. Surg. **15**:99, 1927.
16. Bacon, H. E.: Anus, Rectum, Sigmoid Colon. 3d ed. Philadelphia: J. B. Lippincott Co., 1949, p. 590.
17. Boyd, W. M.: Textbook of Surgical Pathology. 4th ed. Philadelphia: W. B. Saunders Co., 1941.
18. Minelli, C.: Cited by Alevoli.[20]
19. Cicala, M.: Lipoma del Cieco Determinante Intussuscezione, Clinica Chir. **21**:1561, 1913.
20. Alevoli, E.: La Genesi del Lipoma, Policlinico (sez. chir.) **7**:28, 1900.
21. Borst, M.: In Pathologische Anatomie, edited by L. Aschoff. Jena: Fischer, 1921, vol. 1, p. 611.
22. Geschickter, C. F.: Lipoid Tumors, Am. J. Cancer **21**:617, 1934.
23. Manheim, S. D., and Peskin, H.: Spontaneous Elimination of a Lipoma from the Sigmoid Flexure, J.A.M.A. **118**:1214, 1942.
24. Bacon, H. E.: Anus, Rectum, Sigmoid Colon. 3d ed. Philadelphia: J. B. Lippincott Co., 1949, p. 662.
25. Weber, H. M.: Factors of Error in the Roentgenological Diagnosis of Diseases of the Colon, Radiology **14**:46, 1930.

To Our Contributors Abroad

We regret to announce that under current publishing conditions it has become impossible for the *Journal* to arrange the translation into English of original articles submitted in other languages. With the single exception of articles written specifically for the *Seccion en Espanol*, which, of course, do not require translation, we must therefore request that all articles henceforward be submitted in the English language. Prompt publication can be greatly facilitated if all manuscripts are typed in double or triple space to allow room for editorial corrections. Your cooperation will be deeply appreciated.

Barium Modification with Methocel* in Diagnosis of Bowel Lesions

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A PRELIMINARY study[1] of the action of ingested barium sulfate proves that the primary cause of impactions is the affinity of the salt particles for each other. This causes it to be immiscible with mucus or the fecal stream and leads to inspissation and the formation of concretions.

In attempting to overcome this disconcerting and often dangerous feature of the radiopaque material, many agents have been added to it. The results are variable; some mixtures interfere with digestion or irritate the mucus membrane to such a degree as to produce abnormal mucosal patterns, making the validity of the roentgen interpretations questionable.

A safe barium salt has long been sought. It is recognized that by deflocculation the basic salt can be prevented from losing its vehicle by absorption. The substance found most useful in accomplishing this purpose is methylcellulose, or methocel, one of a group of soluble cellulose compounds principally used in medicine as a bulk producing agent, and in industry as sizing material or as an adhesive for ceramics.[2] When methocel is added to water, a stable colloid is formed that has excellent lubricating properties. It is tasteless, does not interfere with digestion and has no effect upon the normal symbiosis of coliform organisms. It mixes well with all intestinal secretions and is eliminated without disturbance as part of the fecal stream.

When barium sulfate and 2.5 per cent methocel are well mixed and added to water, a permanent suspension is formed. Microscopic examination of the mixture (Fig. 1) shows a constant dispersion of the salt particles and Brownian movement, indicating the presence of an isoelectric suspension. This solution is well tolerated by the digestive tract and passes without delay or need for purgation, even after retention for several days, which is frequent in the aged and in persons with bowel musculature of diminished propulsive force.

Clinical evaluation of this combination proves additional values in its greater translucency and the sharper details of the mucosal patterns it reveals. Viewing the hollow viscus with a thick mixture of barium and water gives limited information concerning the existing pathologic condition. The defloceculated barium, because of its alteration to an even and finer dispersion, shows greater luminosity. This is of particular use in differentiating gastric lesions which sometimes are missed or misinterpreted by roentgen examination (Figs. 2 and 3). The lightening-up effect, a fleeting interference with the flow of the solution, localizes intrinsic lesions in the bowel (Fig. 3). The importance of this is well understood in searching for pathologic changes hidden by loops of bowel, e.g., in the sigmoid and splenic flexure areas of the colon. The cobra sign, demonstrating the size and location of polyps, can be seen with greater ease.

The double air contrast technic of major intestinal study with the suspended barium is also enhanced. Five hundred Gm. of the methocel-barium mixture added to 2 quarts of water is a suitable quantity for enema studies. When a thinner mixture is required, 2 tablespoonfuls of the dry mixture may be added to the usual quantity of barium sulfate will be effective. These solutions, when visualized fluoroscopically, are seen to flow more slowly through the lumen of the bowel. This is believed to be due to the adhesiveness of the colloid and is of value, since it prevents too rapid coating of smaller pathologic variants. It is also noted that a third-dimensional effect is readily obtained. Normal as well as abnormal variations

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*Brand name for methylcellulose. Manufactured by Dow Chemical Company.

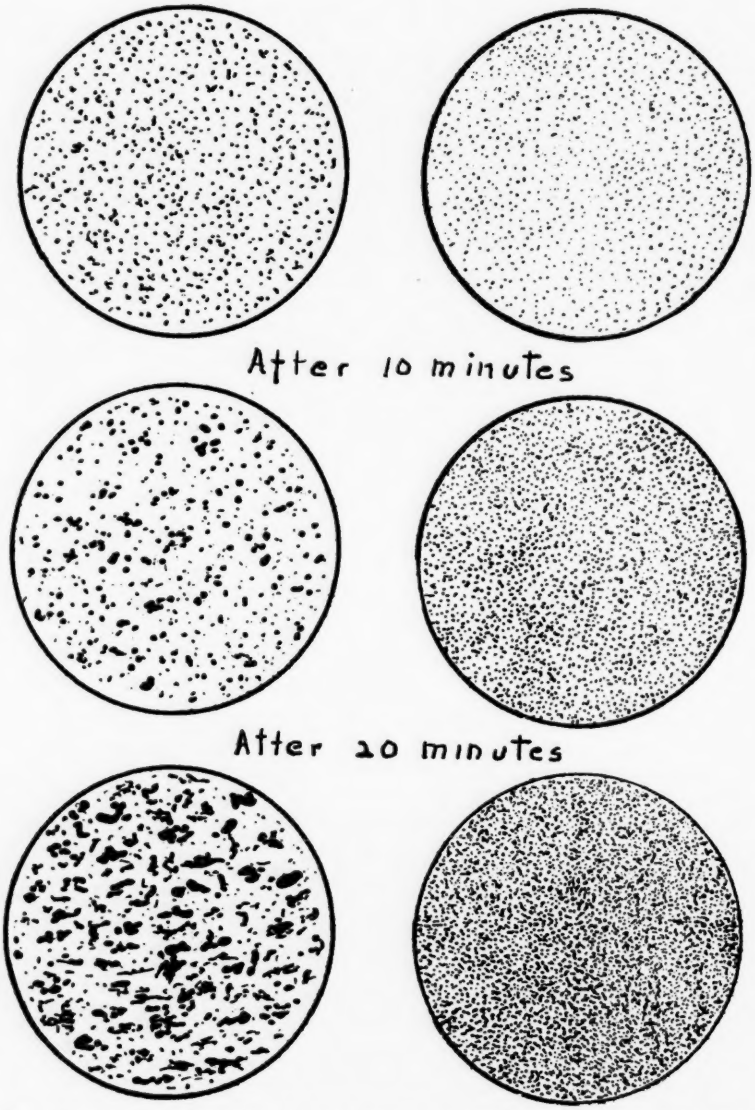

Fig. 1.—Microscopic illustration of the effect of evaporation on barium-water *(left)* and barium-methocel-water (*right*).

are sharply defined. Diverticula are well coated and empty, without retention. Malignant invasion of the bowel wall can more easily be demonstrated (Figs. 5 and 6).

Cachexia, avitaminatosis and other physiologic changes become evident in the altered

Fig. 2.—Defect in region of cardia, observed through a distensible fundus, which proved to be carcinoma of cardia.

Fig. 4.—Lightening-up effect illustrating location and size of a pedunculated polyp.

Fig. 3.—Penetrating ulcer of lesser curvature of stomach, with displacement of rugal markings at base. This proved to be a benign ulcer with marked edema.

Fig. 5.—Diverticulosis with defect at splenic portion of transverse colon, with evidence of invasion of bowel wall.

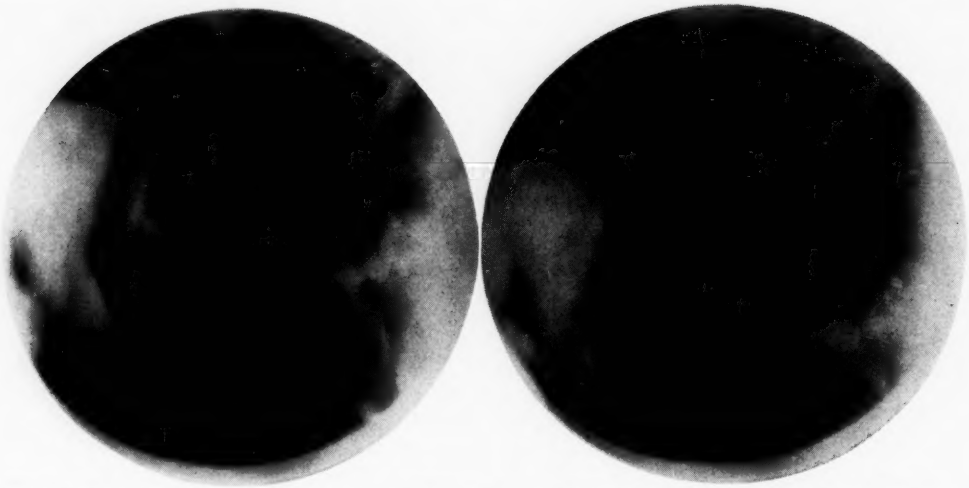

Fig. 6.—Spot films in same case, showing scalloped edges and apple core signs of constricting carcinoma.

shadows and can readily be seen. Ulcerative colitis, regional ileitis and polyposis can be identified with greater accuracy because of the improved clarity of the fluoroscopic and plate images. Diseased bowel may easily be differentiated from the uninvolved parts and progress followed with greater assurance.

SUMMARY

Methocel added to barium sulfate, when placed in solution, becomes a permanent suspension that does not inspissate or form impactions.

Greater mucosal detail is demonstrated by its use, and a third-dimensional effect is obtained when air contrast studies are done.

RIASSUNTO

"Methicol" aggiunto al solfato di bario quando messo in soluzione diviene una sospensione permanente che né viene spessata né forma delgi imballaggi. Coll' impiego si dimostra piu vivo la particolaritá dell mucosa ed un effetto, terzo dimenzionale, risulterá nel compimento di studio in aria contrasto.

ZUSAMMENFASSUNG

Die Mischung von Methocel mit Bariumsulfat und Wasser ergibt eine dauerhafte Suspension, die weder zu Eindickung noch zu Verklumpung fuehrt. Ihre Anwendung verbessert das Detail der Schleimhautdarstellung und ruft, wenn bei der Untersuchung Luft als Kontrastmittel hinzugefuegt wird, einen stereoskopischen Effekt hervor.

RÉSUMÉ

L'addition de methocele au sulfate de barium mis en solution donne uns suspension qui ne se dépose pas et qui ne se solidifie pas. Les détails de la muqueuse sont mieux démontrés par son emploi et on obtient ainsi une troisieme dimension après distension effectuée pour l'étude des contrastes aérés.

REFERENCES

1. Read at the Annual Meeting of the American Proctological Society, Los Angeles, July 3, 1950.

2. Werle, E.: The harmlessness of sodium glycholate, etc. Chem. Ztg., **65**:320, 1941. Brown, C. J. and Houghton, A. A.: Response of laboratory animals to cellulose, glycolic acid and its sodium and aluminum salts. Food Research **9**:175, 1944. Marks, Mark M.: Cellulose esters in the treatment of constipation. South. M. J. of Digestive Diseases **16**:215-217, 1948.

Acute Pancreatitis

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KNOWLEDGE of acute pancreatitis is comparatively recent. The first clear-cut correlation of the gross pathologic and clinical aspects of acute hemorrhagic pancreatitis was made by Reginald Fitz in 1889. Thereafter, in sporadic cases, acute hemorrhagic pancreatitis was recognized preoperatively or ante mortem, but more often the disease was first diagnosed at the operating table or the autopsy table, whereupon the surgeon was likely to exhibit almost as much shock as his patient.

Acute hemorrhagic pancreatitis, however, was and still is a rare disease. Shortly after World War I there were occasional reports of a milder form of pancreatitis, or pancreatic edema. Yet fifteen years ago Elman was able to find only 34 cases of acute transient pancreatitis reported in the world medical and surgical literature. Today it is known that this condition, which is variously termed acute transient pancreatitis, acute interstitial pancreatitis or acute pancreatitic edema, is an extremely common disease. In the hospital in which I practice, records show that, over a thirteen-year period (between 1934 and 1947), 1 of every 600 patients admitted to the surgical and medical services was found to have acute pancreatitis (proved by serum amylase determinations), and the true incidence is undoubtedly greater, since some of the cases were not recorded in the early years of the hospital history. This increasing incidence of the diagnosis of acute pancreatitis is due to the work of pioneers in the field: first, Elman, who discovered that the level of blood amylase is elevated in the presence of pancreatitis; second, Michael Somogyi, who developed a rapid, delicate technic of determining the blood diastase level, and third those adherents of Elman who carried on the campaign he began.

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Unawareness of the frequency of acute pancreatitis and experience with a fairly large number of cases during the past fifteen years have led to the formulation of certain answers to the clinical problems presented in these cases.

Obviously the clinician's first problem in dealing with acute pancreatitis is making the diagnosis. Only rarely can acute hemorrhagic pancreatitis be diagnosed on the basis of the triad of profound shock, peritoneal irritation and signs of ecchymosis about the umbilicus or the left costovertebral angle. As a matter of fact, I have not seen a combination of this sort in the past twenty years. In my experience the only way to diagnose pancreatitis with certainty is to confirm the existence of an elevated blood diastase level. Pain in the upper part of the abdomen (radiating either to the right or the left), nausea, vomiting, epigastric tenderness, slight fever, leukocytosis and mild jaundice are features of most cases. Yet, when the physician has completed the physical examination and noted the history of the patient, rarely, if ever, is he able to state unequivocally that the patient has acute pancreatitis rather than a coronary occlusion, a perforated ulcer, acute cholecystitis or intestinal obstruction. In my experience there is no typical clinical picture. At best the physician can only suspect acute pancreatitis. It is up to the laboratory to confirm the diagnosis by finding an elevated blood or urine diastase level.

In a series reported by myself almost ten years ago, about 75 per cent of the patients had diastase levels of over 500, and it is my impression now that, if we should analyze these cases since that time, the percentage would be even higher. It has been our practice to order a blood diastase determination whenever the patient complains of severe pain in the upper part of the abdomen. During the past year I have encountered 2 cases of acute pancreatitis with elevated diastase levels occurring in the first few postoperative days, when pain was no more than might be complained of by any postoperative patient, but with the patient

going suddenly and inexplicably into shock. It is my feeling now that a blood diastase determination should be carried out in the case of any patient who goes into seemingly unexplainable shock after a laparotomy, particularly if the operation was in the upper part of the abdomen.

When renal function is normal, the presence of an elevated blood diastase level plus acute pain in the upper part of the abdomen is pathognomonic of acute pancreatitis, with one qualification; there may exist a posterior perforation of the duodenum or the stomach. About ten years ago I reported a case in which the blood diastase content rose to 600 units. A diagnosis of pancreatitis was made and the patient treated conservatively. Unfortunately the patient died, and the autopsy revealed peritonitis from a posterior perforated ulcer. Of 9 cases of perforated ulcer, the blood diastase level in 3 cases was slightly elevated; only in the fourth (previously mentioned) was it moderately elevated. This is to be contrasted with the foregoing observation that in about 75 per cent of cases of pancreatitis there is a diastase level of over 500 units.

Fortunately about 90 per cent of freely perforating ulcers are anterior, so that difficulty in differentiating pancreatitis from a perforated ulcer should seldom arise.

In diastase determinations for several thousand patients, 1 patient has been encountered who characteristically had a blood diastase value over ten times the normal. Clearance studies revealed specific inability to excrete diastase normally into the urine.

Unfortunately, elevation of the blood diastase value is subject to one serious limitation. The elevation is only transient. In general, it lasts three to four days after the onset of abdominal pain, but it may be of much shorter duration, sometimes as short as thirty-six hours.

Recently, Knight and Meuther of St. Louis University proposed a prostigmine test for pancreatitis. It was their contention that patients who have acute pancreatitis show characteristic alterations of the blood diastase after the intramuscular injection of 1 mg. of prostigmine. This test is now under investigation by Dr. Leo A. Sachar and Dr. Whittico in our laboratories. Studies have been made of the value for blood diastase in normal persons before and after receiving prostigmine. The changes are unpredictable and inconstant. The results of the prostigmine test on 8 patients known to have had acute pancreatitis were observed. The deviations of the blood diastase after the introduction of prostigmine was not characteristic; at any rate, it was well within the limits existing in normal persons. The prostigmine test in my hands has been completely without value thus far.

Elevation of the rate of excretion of diastase in the urine persists for some hours after the elevated blood diastase level has returned to normal. The details of this relation are now being worked out by Dr. Carl Heifetz. Perhaps in the future there will be an occasional return to the older procedure of determining the urine diastase level in order to establish the diagnosis of acute pancreatitis.

Having made the diagnosis, the physician is faced with the problem of treatment. In general, the various methods of therapy fall into two categories: operative and nonoperative. Those who advocate surgical intervention differ as to whether the pancreas can or should be drained, or whether a cholecystectomy should be performed to decompress the common bile duct. Still others recommend operative therapy only in cases of hemorrhagic pancreatitis. On the basis of experience at the St. Louis Jewish Hospital, where over 100 patients with pancreatitis were treated in the past twelve years, I feel that surgical intervention has no place in the early treatment of acute pancreatitis. In my opinion this holds true whether the condition present is hemorrhagic pancreatitis, interstitial pancreatitis or pancreatitic edema. Indeed, in my experience it has been impossible to tell clinically whether one is dealing with mild hemorrhagic or a severe interstitial pancreatitis.

The treatment of the acute attack is primarily symptomatic and supportive. Pain is relieved by an adequate dose of morphine. No relief is usually afforded by intravenous aminophyllin or by nitroglycerin held under the tongue, although they are usually tried. A large, hot, wet pack held to the abdomen often adds to the patient's comfort. When the

discomfort is severe, continuous gastric suction is applied.

Supportive therapy consists of maintaining the patient's nutrition at least to the point of preventing ketosis and, in the presence of shock, of maintaining the blood volume. The latter is accomplished by giving plasma or blood to offset the loss of plasma into the peritoneal cavity. All patients should receive at least 200 Gm. of carbohydrate daily to prevent ketosis.

Under such a regime the vast majority of patients will become afebrile and asymptomatic in less than a week. One hundred patients with acute pancreatitis seen at the Jewish hospital between 1934 and 1949 were managed conservatively, and only 2 died of this disease. Rarely, and presumably only when the pancreatitis is severe, is there persistent fever, and sometimes the appearance of a palpable mass in the epigastrium is noted. This indicates the development of a pancreatic abscess. Surgical drainage of such masses, with removal of necrotic pieces of pancreas, is then indicated. Surgical intervention, therefore, is reserved for the complications of acute pancreatitis rather than employed in the treatment of pancreatitis itself.

Several weeks after a patient has recovered, a gallbladder roentgen series should be obtained if it is not already known that the patient has cholecystic disease. As is well known, about two-thirds of all patients with acute pancreatitis have chronic cholelithiasis, because, for unknown reasons, the gallbladder fails to concentrate the dye regardless of whether the organ is anatomically normal or not during the first two weeks.

If the roentgenogram discloses gallstones, it is my conviction that a cholecystectomy should be performed and the common duct explored as an elective procedure or interval operation. Yet one should realize that these procedures in themselves will not prevent recurrence of pancreatitis. In a series of 65 pancreatitic patients recently studied by me, 11 had undergone previous cholecystectomies. I believe that the common duct should be explored for two reasons. First, of 6 cases in which this procedure was carried out, stones were found in 2; second, if and when an attack of pancreatitis occurs after cholecystectomy, the question always arises whether a stone was overlooked in the common duct. It is some comfort to the surgeon to know that at least he has looked into the common duct. Moreover, the existence of stones at an earlier exploration of the common duct strongly influences the odds of a stone's presence in the common duct later. That is, the chance of a stone's being overlooked is much greater when some stones are found in the common duct than when no stones at all are found.

This brings one to perhaps the most difficult surgical decision to be made in the handling of acute pancreatitis. Should a patient who has repeated attacks of pancreatitis after cholecystectomy be subjected to exploration or reexploration of the common duct? I know of several instances in which such a procedure was carried out, and the common duct was found to be empty. Hence, I feel that pancreatitis *per se* is not an indication for reexploration.

What is the eventual outlook for patients who have had acute pancreatitis? The immediate prognosis as I have seen it is excellent. I cannot be so definite as to what may be expected in the future in these cases, because as yet I have not accumulated a large enough or a long enough experience. When one recalls that the disease has been recognized only in the past fifteen years, it is apparent that knowledge of the natural history of the condition will be somewhat sketchy.

However, it appears from an analysis of my cases that about 50 per cent of the patients will have a recurrence of severe abdominal pain, presumably due to pancreatitis. Of 65 patients observed at the Jewish Hospital in a ten-year period, 14 had recurrences of pancreatitis requiring rehospitalization. Three of the 41 had a third severe attack. The interval between attacks ranged from a few weeks to three and one-half years. Between these severe attacks the patients may have frequent mild pain in the upper part of the abdomen, the pathogenesis of which is unknown. The attacks are so mild that the patient does not require hospitalization and no diastase reading is obtained. On a few occasions a blood diastase level has been deter-

mined during an attack and found to be normal.

Recently (1946) investigators at the Mayo Clinic have centered the attention of those interested in pancreatitis on chronic pancreatitis or, as they call it, "chronic relapsing pancreatitis." For the past half decade "chronic pancreatitis" has been a sort of will-of-the-wisp disease in the clinical literature. Now, however, more consideration must be given to this condition. The Mayo group has suggested that the condition results from repeated attacks of acute interstitial pancreatitis, which, as is now known, is common.

I have not known of the development of chronic pancreatitis; that is, I have not known of a combination of diabetes, steatorrhea, pancreatic calculi and occasionally obstructive jaundice in any of my cases. As yet I am not sure whether this means that clinical chronic pancreatitis is practically never a sequela of acute interstitial pancreatitis or whether it is only an infrequent one.

At present, however, my opinion is that the chronic relapsing pancreatitis characterized by calcification, diabetes, steatorrhea and sometimes obstructive jaundice *probably* has a different pathogenesis. Patients with chronic pancreatitis have a history of daily abdominal pain for months or years before signs of pancreatic insufficiency appear. Patients with interstitial pancreatitis tend to have multiple attacks, but they are free of pain for months or even years. I am impressed by the fact that so many patients with chronic pancreatitis have a history of alcoholism, whereas this is not nearly so often true of patients with acute interstitial pancreatitis. Finally, chronic pancreatitis in my experience is rare, while acute interstitial pancreatitis is very common. Certainly, if chronic pancreatitis is a sequel of repeated acute interstitial pancreatitis, it should be encountered more frequently than it is. However, a final verdict on the eventual fate of patients with acute interstitial pancreatitis must be deferred. If it becomes apparent later that many of them do progress to the stage of chronic pancreatitis, I should be much inclined to divide the sphincter of Oddi as advocated by Doubilet. If, on the other hand, the disease proves to be self-limited, as I now think it is, I shall persist in the treatment I have outlined. To date I have encountered only 1 patient who had had such frequent abdominal pains between her verified attacks of acute pancreatitis that in retrospect a sphincter-cutting operation appears to have been indicated. However, even in her case the pains disappeared after a prolonged period of drainage of the common bile duct through a "T" tube; now, at the time of writing, approximately ten years after her initial attack of pancreatitis, there is still no indication of chronic pancreatitis.

SUMMARY

The author concludes that acute inflammations of the pancreas are far more frequent than is generally supposed. Patients with this disease present no typical clinical picture; hence, the most important diagnostic measure is the determination of the blood diastase level. The vast majority of the patients recover with nonoperative therapy. Surgical intervention should be reserved for the complications of pancreatitis. Acute edematous pancreatitis tends to recur, but in the author's experience it rarely, if ever, progresses to the chronic pancreatitis characterized by calculi, steatorrhea, diabetes and obstructive jaundice.

RÉSUMÉ

Les inflamations aigües du pancréas sont plus fréquentes qu'on le croit. Les malades avec cette maladie, ne pensent pas de se soigner et il en résulte que les méthodes de diagnostic les plus importantes sont la détermination de la diastase du sang.

La majorité des malades se rétablissent avec cette thérapie non opératoire. L'opération sera réserveé pour les complications pancréatiques. Les pancreatites aigües et oédémateuses ont une tendence à recidiver; mais dans notre expérience, il est rare qu'elles, determinent une pancreatite chronique caractérisée par des calculs, par la stéatorrhé, par le diabète, ou par jaunisse obstructive.

RESUMEN

Hemos observado que las inflamaciones agudas del páncreas son mucho más frecuentes de lo que creíamos. Los pacientes que sufren

esta enfermedad no presentan un cuadro clínico típico, de aquí que la medida más importante para el diagnóstico es la determinación de la diastasa sanguínea. La mayoría de los pacientes se restablecen con una terapia no operatoria. La operación debe reservarse para las complicaciones de la pancreatitis. La pancreatitis edematosa tiende a recurrir, pero según nuestra experiencia raramente, si alguna vez, progresa a pancreatitis crónica, caracterizada por cálculos, esteatorrea, diabetes e ictericia obstructiva.

ZUSAMMENFASSUNG

Wir haben gefunden, dass akute Entzuendungen der Bauchspeicheldruese weit haeufiger sind als wir je gedacht haetten. Solche Kranke bieten keine typischen klinischen Krankheitsbilder, und daher ist die Bestimmung der Blutdiastase das wichtigste diagnostische Mittel. Die ueberwiegende Mehrheit der Kranken erholt sich unter nichtchirurgischer Behandlung. Die Operation sollte fuer die Komplikationen der Bauchspeicheldruesenentzuendung reserviert bleiben. Die akute oedematoese Bauchspeicheldruesenentzuendung neigt zu Rueckfaellen, entwickelt sich aber nach unserer Erfahrung nur selten, wenn ueberhaupt, zu einer chronischen Bauchspeicheldruesenentzuendung, die durch Steine, Steatorrhoe, Diabetes und Obstruktionsikterus charakterisiert ist.

RIASSUNTO

Le infiammazioni acute del pancreas sono molto piu' comuni di quanto si ritiene generalmente. Il quadro clinico non e' tipico: la determinazione della diastasi nel sangue e' ancora il metodo di laboratorio piu' utile. La maggioransa dei pazienti guarisce senza operazione. Questa va riservata ai casi nei quali insorgono delle complicazioni. La pancreatite acuta edematosa tende a recidivare, ma non si trasforma quasi mai in una pancreatite cronica caratterizzata da calcoli, steatorrea, diabete ed itterizia.

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Impending Death Under Anesthesia

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IN all surgery there is probably no more dramatic catastrophe than impending death under anesthesia. Sudden stoppage of the heart during an operation is always terrifying. Until recently it was believed that unless circulation could be almost instantly restored, and with it the supply of blood to the brain, irreversible damage to the higher cerebral centers was inevitable, and that, even supposing the patient does survive, the inescapable end result is blindness, paralysis or dementia.

The chief purpose of this presentation is to demonstrate that these consequences are not inevitable; that they do not necessarily follow cardiac arrest of much longer duration than the three or four minutes formerly considered the maximum for survival, and that even serious changes may prove reversible. A case will be reported in which the patient, a young woman, made a full recovery after cardiac arrest of *nineteen minutes' duration*, followed by appendectomy, and about a year later gave birth to a normal child.

This case adds to the mounting evidence that cardiac and respiratory arrest under anesthesia is amenable to control under proper conditions and with adequate technical skill. Its mastery demands split-second decision and instant courageous action by the surgeon and anesthetist.

A busy surgical clinic may expect an average of 1 or 2 of these tragic cases per year.

History.—The first death attributed to anesthesia occurred on Jan. 28, 1848. The earliest reports of manual massage for cardiac resuscitation were the experimental studies of Schiff in 1874. The first attempt at cardiac massage in man, made by Niehaus in 1889, was unsuccessful. Maaj in 1900 reported the first partial success; he established cardiac pulsation and spontaneous breathing for eleven hours. Ingelsbrid in 1901 was the first to succeed in resuscitating the heart, though his experience was not reported until 1904. In 1902 Starling and Lane reported the first case of successful resuscitation of the human heart by subdiaphragmatic massage.

Etiologic Factors.—Cardiac and respiratory arrest may be (*1*) reflex, due to vagovagal stimulation; (*2*) traumatic, due to injury of the heart or pericardium during operation; (*3*) the result of functional abnormality, e.g., ventricular fibrillation due to an oversupply of epinephrine, whether injected or secreted, or (*4*) induced by faulty selection or administration of anesthetic agents.

Pathologic Picture.—Three vascular syndromes are associated with this emergency: *vasoporosis, vasoparalysis* and *vasothrombosis* (Scheinker). These may be considered phases of the same process, depending on its duration and severity.

The functional impairments resulting from abrupt interruption of the blood supply to the cerebrum are due primarily to anoxia, which induces hypoglycemia and an increase in extracellular potassium. Stasis of circulation causes local accumulations of carbon dioxide and other metabolites. Carbon dioxide, an active vasodilator, causes increased permeability of the vessel wall, especially at the point of transition from capillary to venule, where oxygen tension is at its lowest and the endothelium most vulnerable. Accumulation of fluid and blood cells in dilated perivascular spaces further retards the circulation, thus setting up a vicious circle that increases hypoxia and damage to nerve tissues.

After restoration of the vital centers there occurs a period of hyperactivity. Coma may last for twenty-four hours after an arrest of only four minutes. The period of transition that follows lasts for several days, with gradual return of cerebral functions. Cerebellar ataxia is the most persistent neural dysfunction prior to recovery.

Symptoms.—The principal signs and symptoms of cardiac arrest are (*1*) stoppage of breathing; (*2*) disappearance of pulse beat, blood pressure and cardiac sounds; (*3*) ab-

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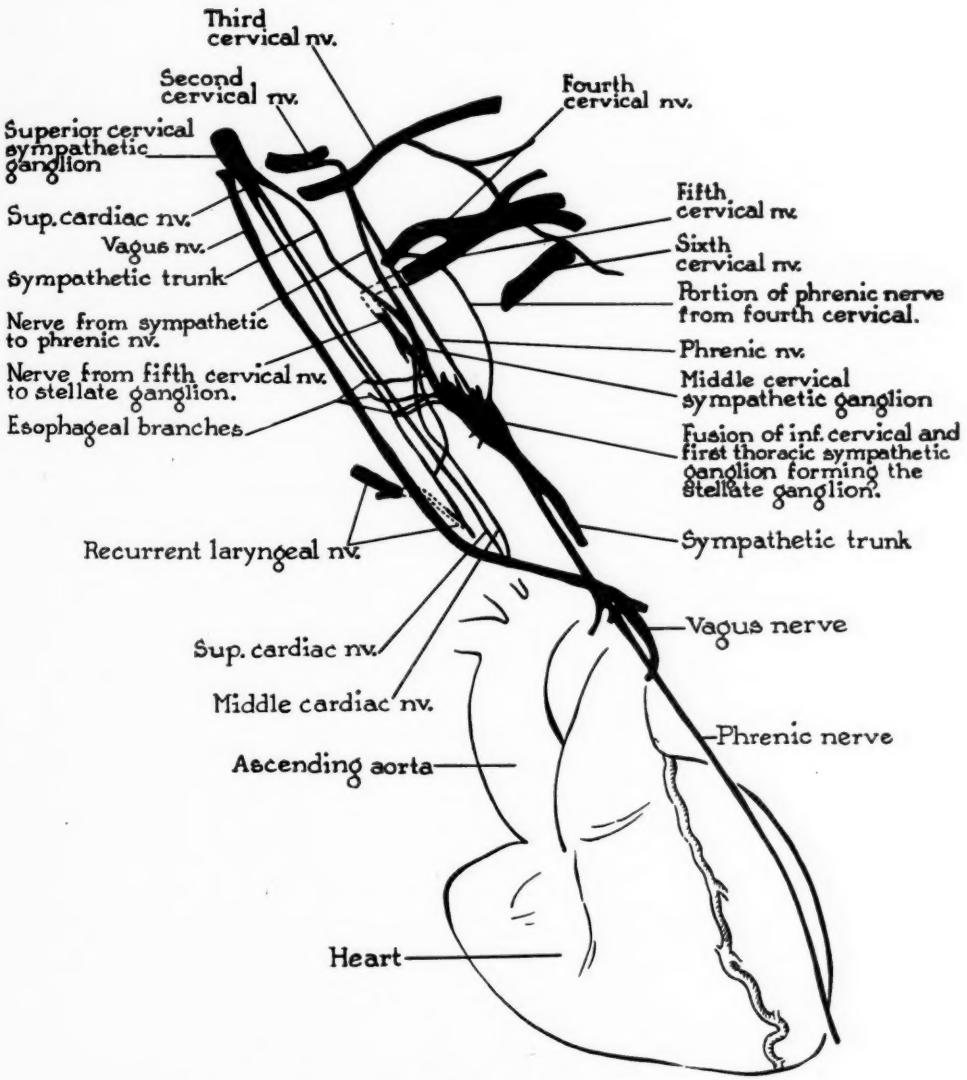

Diagram of nerve paths to pericardium and heart. From Coffey (see bibliography).

sence of bleeding in the surgical wound, and (*4*) pallor or cyanosis. If anoxia is far enough advanced the pupils may be dilated. The first symptom noted is usually cessation of breathing.

Diagnosis.—The first step is to answer the all-important question: *Has the heart actually ceased to beat?* Immediately on stoppage of breathing the anesthetist should feel the pulse to test the circulation. If the surgeon has access to one of the larger arteries, he should test it by palpation. If the abdominal or the

thoracic cavity has been opened he should palpate the heart from below or from above, as the case may be.

If neither of the great cavities is open, the heroic measure of opening the chest is justified. Sudden cessation of pulse and blood pressure make it immediately mandatory. If the heart has actually stopped beating or is fibrillating, the surgeon will then be ready to begin cardiac massage instantly; if the pulse is only extremely weak, little harm has been done.

Prophylaxis.—To prevent overstimulation of the vagus nerves, atropinization or blocking of afferent stimuli with a local infiltration anesthetic has been recommended. For arrhythmia caused by trauma near the pulmonary hilus, 10 cc. of 1 per cent procaine hydrochloride solution may be given intravenously. There is some doubt as to the advisability of applying procaine direct to the heart.

It is important to remember that a patient who stops breathing *is not necessarily suffering from cardiac arrest.* The condition may be the so-called *"blue asphyxia."* Here the trouble is chiefly respiratory, and treatment consists of clearing the airway, pulling the tongue forward, administering oxygen, and removing with the finger any impaction of the epiglottis, together with some form of artificial respiration. On the other hand, *"white asphyxia"* is far graver, having an actual cardiac origin. Here *cardiac massage must be resorted to at once.*

If a diagnosis of cardiac arrest has been made without visualization of the heart itself, the heart may be goaded into action by pricking the auricle with a needle thrust into the third right costal interspace at the upper rim of the fourth rib, close to the sternal border, the needle being directed upward. If this fails, institute cardiac massage at once.

The absolute necessity of immediate decision is obvious. *Delay in diagnosis is the chief cause of failure.* For this reason an alert and well trained anesthetist is indispensable. The anesthetist must notice asystole the instant it occurs, and both he and the surgeon must be ready for instant and decisive action. It goes without saying that a complete outfit of the necessary equipment should always be at hand and in perfect condition for use.

Management: Technic of Massage.—Once actual arrest has been demonstrated, prompt and drastic action must be taken. In such an emergency a calm attitude, clean hands and a keen knife are the important paraphernalia. Act without delay. Asystole calls for cardiac massage to produce an adequate flow of blood and artificial ventilation of the lungs to assure adequate oxygenation.

The heart may be reached by three routes: (*1*) transperitoneal subdiaphragmatic; (*2*) transperitoneal transdiaphragmatic, and (*3*) transthoracic. If the third route is used, make the incision in the left fourth interspace from the edge of the sternum to the posterior axillary line. There is no bleeding. Carry the incision rapidly through the chest wall and the pleura. Introduce the hand between the fourth and fifth ribs and get to the heart. In the presence of asystole this organ is flabby and motionless. If there is ventricular fibrillation it will feel like a "bag of worms."

I prefer the standard method of cardiac massage, which is as follows: make an abdominal opening in the midline from the xiphisternum, large enough to admit the right hand. With the heel of the left hand pressing downward from the outside, the balls of the fingers of the right hand can exert effective pressure on the ventricles through the diaphragm. For about thirty seconds these intermittent movements should be quick and strong. A single contraction of the heart should never be mistaken for victory; all too often it is not repeated unless the surgeon continues his efforts without pausing. Where success is not prompt, enter the pericardial sac through the diaphragm.

Surgeons differ as to the rate at which the heart should be compressed. The majority recommend 20 to 60 compressions per minute.

There are some variations of approach. For example, Nicholson makes a buttonhole incision in the diaphragm, behind the xiphisternum. The surgeon's thumb is passed through the opening, and massage is accomplished by compressing the ventricles as one would squeeze the bulb of an atomizer. Lampson's approach is intercostal, with an incision in the fifth space for direct access to the pleural cavity. The first two fingers of the surgeon's

left hand are inserted, and massage is performed by compressing the ventricles against the sternum at the rate of about one compression per second.

Beck uses electrical stimulation in cases of ventricular fibrillation. Two padded silver electrodes (2 cm. square) are applied to the anterior and posterior surfaces of the heart. An alternating current is applied for 0.1 to 0.5 second. The heart muscle is contracted and brought to a standstill; then normal rhythm is renewed. Should the first shock fail, manual massage is resumed, procaine injected and the shock repeated. If failure still results, 1 cc. of epinephrine 1:1,000 or 5 cc. of calcium chloride 1 per cent is injected into the right ventricle to increase tone and elasticity, after which the shock is again repeated. According to Beck, fibrillation is usually overcome. This method is experimentally interesting but clinically impractical in most cases.

Simultaneously with the beginning of massage, Lahey uses 2 cc. of 2 per cent procaine solution injected into the right ventricle and an equal amount into the pericardial cavity, or 5 cc. of epinephrine 1:1,000 and 9.5 cc. of 1 per cent procaine, both drugs being administered in a single injection. In the presence of actual cardiac arrest, inject 10 cc. of this mixture by the quickest and most easily accessible intravenous route (antecubital vein). If the patient is aged or debilitated, administer only 5 cc. If the heart has not resumed action soon after cardiac massage is begun, inject 5 cc. of the mixture directly into the right auricle or ventricle.

Artificial respiration with pure oxygen is carried on simultaneously with the massage but is discontinued while the incision is being made. The intratracheal tube method is effective.

The importance of prompt massage cannot be overestimated. The first five or six minutes are critical (Weinberger); after that interval, irreparable cortical and medullary changes are said to occur. Delay of more than five minutes in starting massage is hazardous.

Second in importance to cardiac massage is artificial respiration, which implies "rhythmic insufflation of the lungs, preferably through an endotracheal tube, at the rate of 24 per minute and at a pressure not exceeding 15 mm. of mercury." Artificial respiration has a twofold function: to oxygenate the blood in the pulmonary vessels and to aid in maintaining the general circulation.

Complications.—Spinal anesthesia, though extremely valuable for the excellent relaxation it affords, always involves some risk of cardiac arrest. Varying mortality rates have been recorded, from 1 in 100 (Sise) to 1 in 10,000 (Babcock). The true incidence probably falls between these two extremes. Death occurs most frequently in aged persons, poor operative risks and Negroes. For the young, healthy patient spinal anesthesia apparently is no more dangerous than any other type.

"Ether Convulsions."—This condition may be due to (*1*) overheating, (*2*) overoxygenation and cerebral congestion, or (*3*) the action of certain streptococci (Mayo). Treatment consists of (*a*) carbon dioxide and oxygen inhalations, continued even after the convulsions have ceased; (*b*) prompt intravenous injection of sodium pentothal, 3 to 5 cc.; (*c*) injection of lobeline (Bailey), and (*d*) lifting of the patient to a sitting position before pentothal is given (A. Smith).

Collapse of the Patient under Intravenous Anesthesia.—This requires an antidote. Order an intravenous injection of picrotoxin 1/1,000 (1 mg. acts as an antidote for 30 to 40 mg. of pentothal. Collapse under *spinal anesthesia* requires the steep Trendelenburg position and administration of a substance that raises the blood pressure (methedrine).

Aspiration of Vomited Material.—This is serious if not attended to at once. Employ the force of gravity by tilting the whole table; aspirate fluid laryngoscopically from the pharynx, and, when urgently indicated, by means of a laryngotomy or a tracheotomy.

Prognosis.—The *cause* of asystole has much to do with the prognosis. For a normal heart which has received an overdose of anesthetic the outlook is good. For sudden arrest in a normal heart due to reflex phenomena (vagovagal reflex) the prognosis is favorable if the duration of arrest is not over three minutes. Arrest due to asystole or ventricular fibrillation caused by anoxia is a graver matter, since the brain may have suffered damage before the heart stopped beating.

REPORT OF CASE

A married woman aged 23 was admitted to the American Hospital for chronic appendicitis. There was no evidence of other organic disease.

On June 25, 1948 (premedication 1½ gr. nembutal and ⅛ gr. scopalamine) operation was performed. Spinal anesthesia was employed, 14 mg. of pontocaine with 1 cc. of 10 per cent dextrose solution being injected into the subarachnoid space at the level of the third and fourth lumbar segments. The blood pressure prior to its administration was 120 systolic and 80 diastolic.

The anesthesia reached the level of the eighth thoracic segment. On the table the patient was apprehensive, restless and uncooperative. Pentothal sodium in 6 per cent solution was started in the ankle vein not less than ten minutes later, a total of 0.35 gr. being administered by continuous drip for three to five minutes. The blood pressure decreased to 100 systolic and 60 diastolic; one minute later these values dropped to 60 and 0 respectively. The patient's breathing was shallow, but with apparent fair exchange. Her face was livid. No carotid pulse could be felt. Administration of pure oxygen by mask was started at once; the drapes were removed and a check was made for the aortic pulse, without result. At this point I was called. I immediately made a left superior rectus incision, opened the diaphragm and began cardiac massage. At the same time I ordered an intracardiac injection of epinephrine 1:10,000, in the amount of 5 cc., meanwhile continuing to massage the heart. Between five and six minutes later, cardiac action was observed. During this time the patient, who had altogether ceased to breathe, was intubated, and artificial respiration with pure oxygen was begun. Five per cent dextrose in water was started in a vein of the foot and set to run as rapidly as possible. When the heart action was firmly reestablished, appendectomy was carried out through the upper left rectus incision made to reach the heart.

The total time of cardiac arrest was nineteen minutes.

The patient remained in deep coma for four days. There was no response to noxious stimuli. The pupils were dilated and fixed. A classic Magnus-de Kline phenomenon was present, as was a continuous bilateral Babinski sign. On the day of the operation one gained the impression of cortical degeneration secondary to cerebral anoxia. Bilateral block of the stellate ganglion was performed and repeated on each of the two following days. Spinal puncture on the first postoperative day yielded clear normal fluid under a pressure of 280. The coma had apparently deepened. The pupils were smaller and the Magnus-de Kline phenomenon present.

On June 28 the patient seemed less oblivious, though still in coma. There was no response to stimuli, but the eyes were open and the pupils wide, round, equal and reacting to light. The fundi were normal. There was no sucking reflex. No stiffness of the neck was observed. The limbs were extended. Occasionally the legs stiffened, the feet assuming a tonic equinovarus position. Deep reflexes were present in all four extremities. No pathologic arm reflexes were noted. The Babinski sign was easily elicited bilaterally, though it was more marked on the right.

On June 29 the patient's condition grew worse. She was weak and pale, her lips cyanotic and her respirations shallow. She vomited repeatedly. On June 30 her sensorium was slightly clearer. She responded to her name by opening her eyes and trying to fix them on the examiner. Hypertonicity of the limbs had disappeared. There was no increase in the deep reflexes, but the Babinski sign was still marked on both sides. On July 2 there was a definite if slight improvement. The patient was less lethargic and understood simple orders; she could follow an object with her eyes in any direction, and there was no nystagmus. She could move her arms and legs feebly; the left arm wavered. She was still unable to utter vocal sounds. All the deep reflexes were markedly decreased, but the bilateral Babinski sign was present.

On July 3 and 4 her improvement continued. She regained full consciousness, appeared to understand what was said to her, and was able to smile. Motor weakness in the extremities was still marked. The reflexes were unchanged.

By July 9, motor power in the legs showed considerable improvement. The arms were still weak. The finger-nose test revealed disturbance in coordination on the left side. The patient still could not talk but repeated some vowel sounds and one-syllable words in a low, tired voice. By July 12 she uttered complete sentences, though her speech was slurred, scanning and indistinct. July 13 found her able to walk with assistance, though she staggered and kept her gaze on the floor. Babinski and Gonda signs were marked on the left side, less pronounced on the right.

From this time on the patient's progress was steady. Her gait, motor power and articulation improved. Amnesia was present, dating from her admission to the hospital. She could write only single letters but solved simple arithmetic problems with no difficulty. The Babinski sign disappeared from the right side. By July 27 she was able to walk alone. Her strength had increased. The objective neurologic signs were about the same, but

the deep reflexes were more nearly normal and the Babinski sign on the left was now equivocal. On discharge from the hospital her mental processes were still foggy and her speech hesitant, but improvement continued. By November the finer movements of the extremities were entirely restored and her speech was practically normal. She was then two and a half months pregnant. Her gestation was normal, as was her delivery after three hours of labor. No anesthetic was used. The child was a healthy boy weighing 7 pounds 7 ounces (3.4 Kg.).*

GENERAL COMMENT

Numerous recent contributions, including both clinical and experimental experience, have been made to the literature on this subject (see bibliography). The duration of arrest after which the patient may recover remains an open question. Touroff and Adelman in 1949 reported a case in which the patient recovered fully after an arrest lasting forty minutes. They expressed their opinion that cardiac massage is the prime factor in maintaining life until spontaneous cardiac action is restored. They referred to the work of Dripps and his co-workers, who stated that skilful cardiac massage can produce a systolic blood pressure of 60 to 70 mm. of mercury; they also pointed out that this indicates the possibility of maintaining cerebral circulation by this means.

A case of complete recovery after arrest of twenty minutes was reported by Adams and Hand in 1942. A case has just been reported by the English surgeon Turner in which complete recovery took place after a somewhat prolonged period of dementia followed by progressively milder mental disturbances.

Innervation of the heart and pericardium is of utmost importance in this connection. Nerves of the pericardium include fibers from the phrenic nerve, especially the left one, also probably from the cardiac plexus. The return of regular sinus rhythm in a case described by Touroff and Adelman occurred suddenly on clamping and traction of the pericardium. This, in their opinion, was not coincidental or fortuitous, but indicative of a possibility that these procedures provided some potent stimulating reflex that induced prompt cardiac action. The nature and pathway of this reflex merely can be assumed. Coffey and his coworkers have described a pathway from the pericardium via the phrenic nerve to the superior sympathetic cervical ganglion, and it is possible that a powerful stimulus, traversing this pathway, served to initiate cardiac action. It is not at all unlikely that the opening of the pericardium in my case similarly initiated cardiac function through reflex stimulation (see illustration).

*Since this article was written, the patient has borne another child.

SUMMARY

1. Cardiac and respiratory arrest is a complication, fortunately a rare one, of the administration of anesthetics, particularly spinal.

2. The increasing employment of spinal anesthesia makes it imperative for surgeons to be prepared for this emergency. A complete outfit for the purpose should be at hand, and the entire operating team should be rehearsed in its use.

3. If the abdomen or the thorax has already been opened the surgeon can reach the heart directly. If not, he is justified in opening the thorax. If the heart has stopped or is fibrillating, he should begin cardiac massage instantly. Speed is of vital importance.

4. Three methods of manual massage are available and are described: the standard method, Nicholson's method and the intercostal approach of Lampson, which is useful in the treatment of fibrillation when complete arrest has not occurred.

5. Other complications of anesthesia—ether convulsions and collapse of the patient—are discussed.

6. A case is reported of a young woman under spinal anesthesia for an appendectomy in whom, before the operation was begun, there occurred cardiac and respiratory arrest. The diaphragm and pericardium were opened and cardiac massage was instituted, together with intracardiac injections of epinephrine and the use of artificial respiration. The total period of arrest was nineteen minutes. Satisfactory activity of the heart having been resumed, appendectomy was performed. The patient remained in deep coma for four days and had a stormy postoperative course, but recovered completely and recently gave birth to a healthy child.

7. This favorable end result is added evi-

dence of the reversibility of cerebral damage resulting from prolonged anoxia.

8. The importance of reflex action through the pathway from the pericardium via the phrenic nerve to the superior cervical ganglion is emphasized.

9. Both clinical and experimental data support the concept of a gradient of susceptibility as the neuraxis descends from the cerebral cortex to the spinal cord.

RÉSUMÉ

1. Les arrêts cardiaques et respiratoires constituent une complication heureusement rare dans l'administration de l'anesthésie spinale.

2. L'emploi augmentant de l'anesthesie spinale demande que le chirurgien soit prêt à rencontrer ces accidents. L'outilliage complet pour cela devrait etre à porteé de la main et l'éq uipe operatoire doit etre exercée dans son emploi.

3. Si l'abdomen ou le thorax ont deja été ouverts, le chirurgien doit palper le coeur. Si non, il est justifie d'ouvrir le thorax. S'il y a arrêt du coeur ou fibrillation, on doit immédiatement masser le coeur. La hâte est essentielle.

4. Trois methodes de massage manuel sont décrites; la méthode standard, la méthode de Nicholson et celle de l'approche interscostal de Lampsonqui est utile dans le traitement des vibrations quand l'arrêt complet du coeurn'est pas survenu.

5. D'autres complications de l'anesthésie: convulsions d'éther et collapsus du malade, sont discutées.

6. L'auteur rapporte le cas d'une jeune femme qui sous anesthesie spinale pour appendicite, subit un arrêt cardiaque et respiratoire avant l'opération. Le diaphragme et le pericarde furent ouverts et le coeur massé. On administra des injections d'épinephrine et on eut recours a la respiration artificielle. La période d'arrêt dura 19 minutes. L'activite spontaneé du coeur ayant repris, une appendectomie futfaite. La malade demeura en coma pour 4 jours et eut une periode postopératoire tres sérieuse. Elle se retablit complètement et recemment donna naissance à un enfant bien portant.

7. Cette fin favorable est une évidance de reversibilité complète apres dommage cérébral résultant de profonde anoxemie.

8. L'importance d'action reflexe à travers la voie du pericarde via le nerf phrénique au ganglion cervical superieur est decrite.

9. La clinique et l'elude de laboratoire supporte la conception d'un degré de susceptibilite vu que le nevraxe descend du cortex cérébral à la moelle épinière.

ZUSAMMENFASSUNG

1. Herz- und Atemstillstand sind eine (gluecklicherweise seltene) Komplikation der Narkose, besonders der spinalen Anaesthesie.

2. Die wachsende Anwendung der Spinalanaesthesie laesst es unerlaesslich erscheinen, dass der Chirurg fuer derartige Notfaelle vorbereitet ist. Eine vollstaendige dem Zweck entsprechende Ausruestung sollte bereit und der gesammte Operationsstab mit ihrer Anwendung gut vertraut sein.

3. Wenn die Bauch- oder Brusthoehle bereits eroeffnet ist, kann der Chirurg das Herz direkt erreichen. Ist das nicht der Fall, so ist er berechtigt, die Brusthoehle zu oeffnen. Wenn das Herz aufgehoert hat zu schlagen, oder wenn es fibrilliert, sollte mit der Herzmassage unverzueglich begonnen werden. Eile ist lebenswichtig.

4. Drei Methoden der manuellen Massage stehen zur Verfuegung und sind beschrieben worden; naemlich das allgemein gebraeuchliche Verfahren, die Nicholsonsche Methode und der von Lampson angegebene interkostale Weg, der in der Behandlung des Herzflimmerns, wenn noch kein voelliger Herzstillstand eingetreten ist, von Nutzen ist.

5. Andere Komplikationen der Narkose wie Aetherkraempfe und Kollaps des Kranken werden eroertert.

6. Es wird der Fall einer jungen Frau beschrieben, die sich zum Zwecke der Appendektomie unter Spinalanaesthesie befand, und bei der, bevor die Operation begonnen hatte, Herz- und Atemstillstand eintrat. Das Zwerchfell und der Herzbeutel wurden eroeffnet und Herzmassage unter gleichzeitiger intrakardialer Einspritzung von Adrenalin und Anwendung von kuenstlicher Atmung begonnen. Die Gesamtdauer des Stillstands betrug 19 Minuten. Nachdem das Herz seine eigene Taetigkeit wiederaufgenommen hatte, wurde die Appendektomie ausgefuehrt. Die Kranke

verweilte vier Tage lang in einem tiefen Koma und ging durch eine stuermische postoperative Periode, erholte sich aber vollstaendig und gebar kuerzlich ein gesundes Kind.

7. Dieses guenstige Endergebnis stellt einen zusaetzlichen Beweis fuer die Umkehrbarkeit von Hirnschaedigungen dar, die als Folge schweren Sauerstoffmangels eintreten.

8. Die Bedeutung des Reflexmechanismus auf dem Wege vom Herzbeutel ueber den Zwerchfellnerven zum oberen Halsganglion wird hervorgehoben.

9. Sowohl die klinischen als auch die experimentellen Daten unterstuetzen die Auffassung, dass, waehrend der Axiszylinder von der Hirnrinde zum Rueckenmark hinabsteigt die Empfindlichkeit steigt.

RIASSUNTO

1. L'arresto cardiaco e respiratorio e una complicazione, felicemente rara, nell'amministrazione delle anestesie, particolarmente l'anestesie spinale.

2. L'impiego accrescitivo dell'anestesia spinale costringe i chirurghi di essere preparati per questo avvenimento. Un aramento completo per questo scopo dovrebbe essere sotto mano e l'intero corpo operatorio ben recitato nel uso.

3. Se l'addomine od il torace siano giá apperti il chirurgo puo attaccare il cuore direttamente. Altramente, e' giustificato dovrebbe cominciare subito il massaggio del cuore. Velocita' e' essenziale.

4. Tre metodi di massaggio manuale sono efficaci e qui descritti il metodo di NICHOLSON e l'accesso intercostale di Lampson, il quale e' utile nel trattamento di fibrillazione quando non occorre arresto completo.

5. Descrive complicazione di anestesia, convulsioni di etere e indebolimento del pazienti.

6. Si rapporta un caso di una donna giovane sotto anestesia spinale per appendectomia, nella quale, innanzi che l'operazione sia cominciato, si presentarono arresto cardiaco e respiratorio. La diaframma ed il pericardio furono aperti e massaggio cardiaco cominciato, insieme coi inizioni intra cardiaco di epinefrina e respirazione artifiziale. Il tempo totale d'arresto era diecinova minuti. L'attivita' spontanea del cuore essendo ripreso, l'appendectomia fu eseguito. La paziente rimaneva in coma profondo per quattro giorni, ed aveva corso postoperatorio tempestuoso, ma ha ricuperato interamente e recentamente dette nascita ad un fanciullo sano.

7. Questo risultato compito favorevole e prova aggiunta della sopravvivenza del danno cerebrale risultando dell'anossia profonda.

8. L'importanza del processo riflesso a traverso il cammino dal pericardio via il nervo frenico al ganglio cervicale superiore e' accentuato.

9. Tema clinico ed esperimentale sostiene il concetto di chinamento di suscettibilita' come la neurasse discende dalla corteccia cerebrale al midollo spinale.

BIBLIOGRAPHY

Adams, H. D., and Hand, L. V.: Twenty-Minute Cardiac Arrest with Complete Recovery, J.A.M.A. **118**: 133, 1942.

Adriani, J.: Physiologic Changes During Anesthesia, Texas State J. Med. **42**:628, 1947.

Bailey, H.: Cardiac Massage for Impending Death Under Anesthesia, Brit. M. J. **2**:84, 1941.

Barber, R. I., and Madden, J. L.: Historical Aspects of Cardiac Resuscitation, Am. J. Surg. **70**:135, 1945.

Beck, C. S.: Resuscitation for Cardiac Standstill and Ventricular Fibrillation Occurring During Operation, Am. J. Surg. **54**:273, 1941.

Beck, C. S.; Pritchard, W. H., and Feil, H. S.: Ventricular Fibrillation of Long Duration Abolished by Electric Shock, J.A.M.A. **135**:985, 1947.

Beecher, H. K.: The First Anesthesia Death, with Remarks on the Fields of the Laboratory and the Clinic in the Appraisal of a New Anesthetic Agent, Anesthesiol. **2**:443, 1941.

Charlewood, G. P.: Cardiac Arrest: Modified Technic of Cardiac Massage, Brit. M. J. Dec. 11, 1948, p. 1023.

Coffey, W. S., and others: Angina Pectoris: The Anatomy, Physiology and Surgical Treatment, New Orleans: A. J. Dickerson, 1927.

Davis, D. A.: Systemic Disturbances Occurring During Anesthesia, South. M. J. **40**:236, 1947.

Dripps, R. D., and others: Cardiac Resuscitation, Ann. Surg. **127**:592, 1948.

Eastman, W. J., and others: Relative Value of Pure Oxygen and of Carbon Dioxide Mixtures in Experimental Resuscitation, Am. J. Obst. & Gynec. **36**:571, 1938.

Fauteux, M.: Cardiac Resuscitation, J. Thoracic Surg. **16**:623, 1947.

Fox, J. O. Jr.: Restoration of Cerebral Function After Prolonged Cardiac Arrest, J. Neurosurg. Sept. 1949.

Gunn, J. A.: Massage of Heart and Resuscitation, Brit. M. J. **1**:9, 1921.

Hoff, E. C.; Grenell, R. G., and Fulton, J. F.: Histopathology of the Central Nervous System After Exposure to High Altitudes, Hypoglycemia and Other Conditions Associated with Central Anoxia, Medicine **23**:161, 1945.

Hooker, D. R.; Kouwenhaoven, W. B., and Langworthy, O. R.: The Effect of Alternating Electrical

Currents on the Heart, Am. J. Physiol. **103**:444, 1933.

Kabat, H.; Dennis, C., and Baker, A. B.: Recovery of Function Following Arrest of the Brain Circulation, Am. J. Physiol. **132**:737, 1941.

Kirgis, H. D., and Reed, A. F.: Temporary Interruption of the Sympathetic Impulses to the Head by Infiltration of the Cervical Sympathetic Trunk, Ann. Surg. **128**:101, 1948.

Lahey, F. H. and Ruzicka, E. R.: Experiences with Cardiac Arrest, Surg., Gynec. & Obst. **90**:108, 1950.

Lampson, R. S., and others: Acute Circulatory Arrest from Ventricular Fibrillation for 27 Minutes, with Complete Recovery, J.A.M.A. **127**:1575, 1948.

Lennox, W. G.; Gibbs, F. A., and Gibbs, E. L.: The Relationship in Man of Cerebral Activity to Blood Flow and to Blood Constituents, J. Neurol. & Psychiat. **1**:211, 1938.

MacLeod, N., and Schnipelsky, L.: Cardiac Massage for Heart Failure Under Spinal Anesthesia, Brit. M. J. **1**:610, 1942.

Mautz, F. R.: Resuscitation of the Heart from Ventricular Fibrillation with Drugs Combined with Electric Shock, Proc. Soc. Exper. Biol. & Med. **36**:634, 1937.

Nicholson, J. C.: Cardiac Massage, Brit. M. J. **1**: 385, 1942.

Nicholson, M. J., and Ruzicka, E. R.: Cardiac Arrest Under Anesthesia, J.A.M.A. **125**:622, 1947.

Prevost, J. L., and Battelli, F.: Sur quelques effets des discharges electriques sur le coeur des manifreres, Compt. red. Acad. d. Sc. **129**:1267, 1899.

Scheinker, I. M.: Neuropathology in Its Clinicopathologic Aspects. Springfield, Ill.: Charles C Thomas, Publisher, 1947, p. 306.

Stage, J. T.: Cardiac Arrest Under Anesthesia, South. M. J. **42**:597, 1949.

Sugar, O., and Gerard, R. W.: Anoxia and Brain Potentials, J. Neurophysiol. **1**:558, 1938.

Thompson, S. A., and others: The Effect of Pulmonary Resusucitative Procedures on the Circulation as Demonstrated by the Use of Radioactive Sodium, Surg., Gynec. & Obst. **73**:387, 1946.

Touroff, A. S. W., and Adelman, M. H.: Resuscitation After Forty Minutes of Cardiac Arrest, J.A.M.A. **139**:844, 1949.

Volpitto, P. P., and others: Influence of Different Forms of Mechanical Artificial Respiration on Pulmonary and Systemic Blood Pressure, J.A.M.A. **126**: 1066, 1944.

Weeks, C., and others: Two Deaths Associated with Supradiaphragmatic Vagotomy, J.A.M.A. **132**:968, 1946.

Weinberger, L. M.: Gibbon, M. H., and Gibbon, J. H. Jr.: Temporary Arrest of the Circulation to the Central Nervous System: Pathological Effects, Arch. Neurol. & Psychiat. **43**:615, 1940.

The **Pan-Pacific Surgical Association** will hold its Fifth Congress in Honolulu, Hawaii, Nov. 7 to 19, 1951. The purpose of the gathering is to bring together surgeons from countries bordering on the Pacific Ocean so that an exchange of surgical ideas and methods, as well as good fellowship, may prevail among the various peoples represented. This is an excellent opportunity to combine a vacation in Hawaii with attendance at a scientific meeting, the program of which bears the names of prominent international speakers. Information regarding the convention may be obtained from the Pan-Pacific Surgical Association, Suite 7, Young Building, Honolulu, T. H.

The **Congress of the International Society of Orthopaedic and Traumatic Surgery** will convene in Stockholm, May 21 to 25, 1951.

The two main subjects to be discussed are (*1*) Avitaminosis and Bone Changes and (*2*) Low-Back Pain and Sciatica: Results of Treatment.

Members of the Association are invited to present subjects of their own, which should be submitted to the Secretary of the Congress, Dr. Anders Karlen, Karolinska Institutets Ortopediska Klinik, Stockholm.

The **Fourth Pan-American Congress of Ophthalmology** will convene in Mexico City, Mexico, Jan. 6 to 12, 1952. An invitation is extended to ophthalmologists of the Western Hemisphere to attend and present papers. Communications should be addressed to Luis Sanchez Bulnes, M.D., Secretary General, Fourth Pan-American Congress of Ophthalmology, la Gomez Farias, 16, Mexico 4, Federal District.

Stainless Steel Cranioplasty

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IN 1944 it occurred to us that 18-8 stainless steel, which had been used for many years by Babcock[1] and others as suture material and by orthopedic surgeons for bone plates, might prove as satisfactory as tanalum for cranioplasty and would cost considerably less. Accordingly, experiments with this material were carried out on dogs and the results published in 1946.[2] In these animals the reaction following stainless steel cranioplasty compared favorably with that reported after use of tantalum. Moreover, since stainless steel is readily obtainable and easily cut and shaped at the operating table, and since the price at that time of an average-sized stainless steel plate was approximately one three hundredth that of a similar plate of tantalum (10 cents versus approximately $30), we suggested that stainless steel be given a thorough clinical trial.*

We have attempted this, and we now report our experience with this material in 22 cranioplasties in human beings (Table 1).

At the time of writing we have not been able to find any report in the literature of a similar series of cases.†

Operative Technic.—The tools and material used are shown in Figure 1. The technic was a modification of that suggested by Gardner[3] for tantalum cranioplasty. In all but 1 instance the plates were prepared directly in the operating room, without preliminary fitting. The plates were never inserted in the presence of infection or within six months after infection.

The edges of the bony defect are freed from the dura (Fig. 2*A*). Every effort should be made to conserve and repair dural defects by suture, by a periosteal or aponeurotic graft or by dural substitutes (polyethylene film or fibrin film). That this is not always essential can be seen in Cases 7 and 8 (Table 1). The edges of the bony defect may be beveled to permit the plate to lie flush with the outer surface of the skull, but this is not essential if the defect is within the hair line. A rough pattern of the defect is then made from rubber dam, polyethylene film or cardboard, allowing approximately 5 mm. of additional width along the edges. While one member of the team is beveling the bone margins, another fashions, hammers and perforates the plate (Fig. 2*B*). The plate is cut out of a stock piece of stainless steel with double action aviation shears (Fig. 1) and is then shaped to the proper contour by hammering it with a mallet against the concave surface of a block of hard wood. The plate is then fitted to the bone opening and properly trimmed to shape with double-action aviation shears. It is then placed in position in the bone defect, and markings are made with a scriber ¼ inch (0.64 cm.) back of the bone margins and corresponding points on the plate. Holes are then drilled through each border of the bone with the aid of a hand drill and an Adson bone-holding forceps (Fig. 2*C*). The corresponding holes are then made in the plate with a double-action punch (Fig. 2*D*). An additional number of perforations may be made in any portion of the material to permit future fixation of the metal by ingrowing granulation and scar tissue and also to permit any serum to escape from under the plate. A No. 30 stainless steel suture is next inserted

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*It is important when buying the material **to order 18-8 Mo (1.75-2.50) stainless steel.** This contains roughly 16 to 18 per cent chromium, and 10 to 14 per cent nickel and is fortified by molybdenum. We use the 0.015 thickness and prefer the smooth finish.

It is obvious that if these plates are ordered from a surgical supply house that wishes to make money on the plate, the price may compare somewhat with that of tantalum. The stainless steel should be obtained in lengths of 2 or 3 feet (60.96 to 91.44 cm.) from a recognized dealer in stainless steel. The price of the material when bought in such a manner is ridiculously low as compared with that of tantalum.

†Adelstein has stated that since 1944 he has used stainless steel for cranioplasty in 6 cases. "The results have been excellent" (personal communication, Aug. 8, 1950).

Jaeger mentioned a case in which he placed a large stainless steel plate on top of the skull after removal of a meningioma in 1940. Reexamination of the patient in 1945 showed excellent healing (Discussion[2]).

TABLE 1.—*Summary of Histories in 22 Cases of Stainless Steel Cranioplasty*

Case #	Name	Age	Sex	Race	Diagnosis	Indications for Cranioplasty	Date Inserted	Primary or Secondary Insertion	Location of Plate
1	M.W.	18	M	W	Lge. defect second. to removal infected bone flap elsewhere 5 yr. prev. Post-traum. convuls.	Protection, cosmetic, and possible relief of convulsions	5/30/45	Secondary 5 yr. after bone remov.	R. Fronto-parietal
2	J.G.	41	F	C	Comp. depressed fract. skull L. parietal	Bone defect due to injury	12/20/45	Primary	L. Pariet.
3	M.H.	53	F	C	Bilat. malignant exophthalmus	Maintain orbital decompression	7/12/45	Primary	R. Lat. orbit.
4	E.H.	48	F	W	R. Frontal meningioma	Defect secondary to removal of bone infiltrated by tumor	6/28/45	Primary	R. Front. parietal
5	E.R.	58	M	W	Old. comp. depress. fracture R. frontal	Bone defect, headache, cosmetic	4/1/46	Secondary 5 yr. later	R. Supra orbital
6	A.Y.	57	M	W	Old comp. depress. fracture R. frontal	Headache and vertigo, pulsation in defect	9/12/46	Secondary 16 mo.	R. Forehead
7	S.F.	50	F	W	Meningioma R. frontal	Bone infiltrated by tumor removed	10/28/46	Primary	R. Front-parietal
8	C.S.	10	M	W	Old trephine defect. R. temporal	Pulsation in defect, cosmetic (scar)	1/13/47	Secondary 2 yr.	R. Temp.
9	E.B.	33	F	W	Comp. depress. fract. frontal, secondary to gun shot injury	Protection, cosmetic	1/20/47	Secondary 5 mo.	Mid-forehead
10	K.R.	8	M	W	Old comp. depress. fracture L. parietal	Bone defect, protection	2/9/47	Secondary 8 mo.	L. Parietal
11	E.V.	+5	M	W	Old comp. depress. fracture L. parietal	Bone defect, protection	10/31/47	Secondary 3 yr.	L. Parietal
12	E.S.	22	M	W	Epidermoid L. frontal	Defect after removal of tumor, cosmetic	2/1/48	Primary	L. Frontal
13	W.G.	23	F	W	Eosinopbilic granuloma R. frontal	Defect after removal of tumor, cosmetic	6/1/48	Primary	R. Frontal
14	O.S.	36	M	W	Comp. depress. fracture L. frontal	Defect, cosmetic	7/1/48	Primary	L. Frontal
15	M.A.	9	M	W	Comp. depress. fracture R. occipital	Defect with pulsation, protection	7/1/48	Secondary 1 yr.	R. Occupital
16	E.D.	15	M	W	Very lge. defect due to removal bone flap over subdural abscess	Huge defect, protection, cosmetic	11/5/48	Secondary 11 yr.	Almost entire L. skull
17	A.Z.	25	M	C	Defect secondary to operation for brain abscess	Defect, protection	11/8/48	Secondary 1 yr.	L. Frontal
18	A.S.	32	F	W	Large hyperostosing meningioma. R. frontal	Defect following removal of tumor	12/10/49	Primary	R. Fronto-temp.
19	L.T.	21	M	C	Large defect L. temp. front. secondary to decompress. for tr. intracerebral hematoma	Defect, protection, convulsions	6/4/50	Secondary 8 mo.	L. Fronto-temp.
20	B.S.	1	M	W	Pulsating exophthalmus due to craniostenosis	Reduce exophthalmus and prevent pulsation	5/4/50	Primary	R. Ant. & middle fossal
21	P.L.	40	M	W	Floating bone flap following previous craniotomy	Annoying to patient	2/4/50	Secondary 1 yr.	R. Front.
22	J.N.	24	M	W	Defect old depr. fracture R. Frontal	Protection, cosmetic	7/6/50	Secondary 3 mo.	R. Front.

TABLE 1.—*Summary of Histories in 22 Cases of Stainless Steel Cranioplasty (Continued)*

Size of Defect	Cond. of Scalp over Plate	Condition of Dura	Complications Following Cranioplasty: Effusion over Plate	Infection	Removal	Follow Up	Unusual Symptoms	Results: Symptomatic	Cosmetic
Large	Good	Intact	None	None	—	3 Yr.	Hit on scalp over plate 9 mo. later. Unconscious few minutes	No improvement in convuls.	Fair
Small	Good	Galeal graft	None	None	—	—	Cannot locate patient	—	—
Small	Good	Intact	None	None	—	5 Yr.	None	Good	Good
Large	Good	Defect not repaired	Slight aspirated 6th day	Yes	Yes, poor fitting & infection	—	Reop. c refitting 9 days after 1st op. Rem. 3 mo. because of infection	Unsat.	Unsat.
Small	Extremely thin	Intact	None	None	—	4 Yr.	None	Headache not relieved	Fair
Small	Ex. thin at center of plate	Intact	None	None	—	4 Yr.	None	Headache and vertigo relieved	Good
Large	Good	Lge. defect not repaired	4 mo. post-op. $\bar{c}$ spont. absorptn.	None	—	4 Yr.	None	Good	Good
Med.	Good	Thin, incomplete repair GSF leak	None	None	—	3½ Yr.	None	Good	Good
Large	Thin and scars	Large defect not repaired	None	None	Yes, formation small sinus	—	Repeated formation small sinus in scalp after 3 attempts at repair	Good	Unsat. but cov. by hair
Small	Normal "Y" scar	Intact	Mod. two aspirations	None	—	3½ Yr.	None	Good	Good
Small	Good	Intact	None	None	—	3 Yr.	None	Good	Good
Small	Good	Intact	None	None	—	2½ Yr.	None	Good	Good
Med.	Good	Intact	None	None	—	2+ Yr.	None	Good	Good
Small	Good	Intact	None	None	—	2+ Yr.	None	Good	Good
Med.	Thin	Intact	None	None	—	2 Yr.	None	Good	Good
Very large	Good	Intact	None	None	—	2 Yr.	None	No improvement in convulsions	Good
Med.	Good	Intact	None	None	—	2 Yr.	None	Good	Good
Large	Good	Lge. defect not repaired	Persist. effus. since oper.	None	—	8 Mo.	Mod. fluid collection under frontal scalp	Good	Fair
Med.	Good	Intact	None	None	—	6 Mo.	None	No improvement in convulsions	Good
Small	Good	Intact	None	None	—	6 Mo.	None	Slight improv. in pulsation	Fair
Med.	Good	Intact	Slight aspiration	None	—	8 Mo.	None	Good	Good
Small	Good	Intact	None	None	—	3 Mo.	None	Good	Good

through the drill opening in the bone down to the dura, and then delivered by grasping it with a hemostat inserted between the bone and the dura. Sutures are placed in a similar manner through the other bone perforations, delivered and then inserted through their corresponding holes in the stainless steel plate (Fig. 2*E*). The plate is then firmly anchored to the bone by tying the sutures; usually four to eight are adequate (Fig. 2*F*). The incision is closed in two layers without drainage in the usual manner.

Case Data

A summary of the case histories of 22 patients operated upon by the authors is given in the accompanying tabulations.

TABLE 2.—*Indication for Cranioplasty*

A.	Bone removed because of tumor infiltration (all plates inserted at primary operation)		5
	Meningioma	3	
	Eosinophilic granuloma	1	
	Epidermoid	1	
B.	Bone removed because of depressed fractured skull		9
	Plate inserted at primary operation	2	
	Plate inserted at secondary operation	7	
C.	Miscellaneous causes		8
	Removal elsewhere of infected bone flap	2	
	Orbital decompression malignant exophthalmos	1	
	Pulsating exophthalmos in an infant	1	
	Defect due to operation for brain abscess	2	
	Defect due to old decompression for traumatic intracranial hemorrhage	2	
	Total		22

Fig. 1.—Tools and materials used in shaping stainless steel plate at operating table. *Upper row* (left to right), hammer; hardwood block with concave surface; perforated and unperforated stainless steel plates, and wire mesh. *Lower row*, tinsmith's shears; double action aviation shears; double action punch (these three tools can be bought in any hardware store); hand drill; Adson bone-holding forceps; scriber, and stainless steel wire.

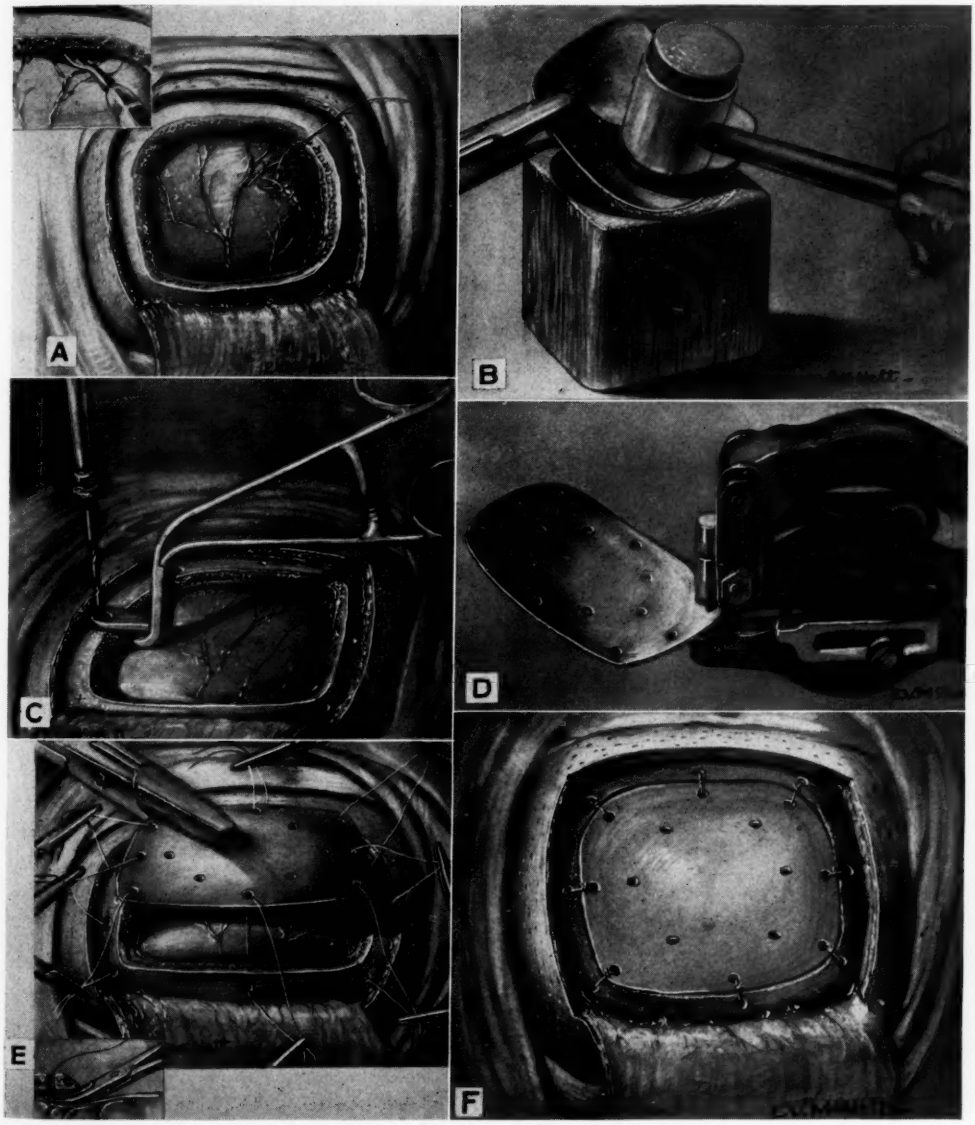


Fig. 2.—Technic of stainless steel cranioplasty (see text). *A*, any dural defect is repaired. Dura adherent to bone margin is released by a dural separator (see insert). Margin of bone is beveled. Pattern of defect is made from rubber sheeting. *B*, plate is cut from a stock piece of stainless steel. Perforations are made in center of plate and plate is fashioned to proper contour as illustrated. It is then fitted snugly to defect and markings for suture holes are made with a scriber ¼ inch (0.6 cm.) back of bone margins and corresponding points on plate. *C*, holes are drilled through entire thickness of skull. Note that lower lip of Adson bone holding forceps stops drill when it penetrates inner table. *D*, corresponding holes along edge of plate are made with a double action punch. *E*, 30 stainless steel sutures are then delivered through drill openings in skull (see insert) and threaded through corresponding openings in plate. *F*, plate is firmly secured by tying off sutures. Incision is closed in two layers with silk or stainless steel wire.

Fig. 3 (*Case 16*).—Large defect due to removal of bone flap eleven years earlier because of subdural abscess. *A*, before plating. *B*, after plating.

TABLE 3.—*Age Incidence*

Age in Years	*No. of Cases*
1-10	5
10-20	2
20-30	5
30-40	4
40-50	3
50-60	3

TABLE 4.—*Location of Defect*

Midforehead	3
Lateral-frontal	6
Lateral-orbital	2
Frontoparietal	3
Frontotemporal	2
Right temporal	1
Parietal	3
Occipital	1
Half of skull	1

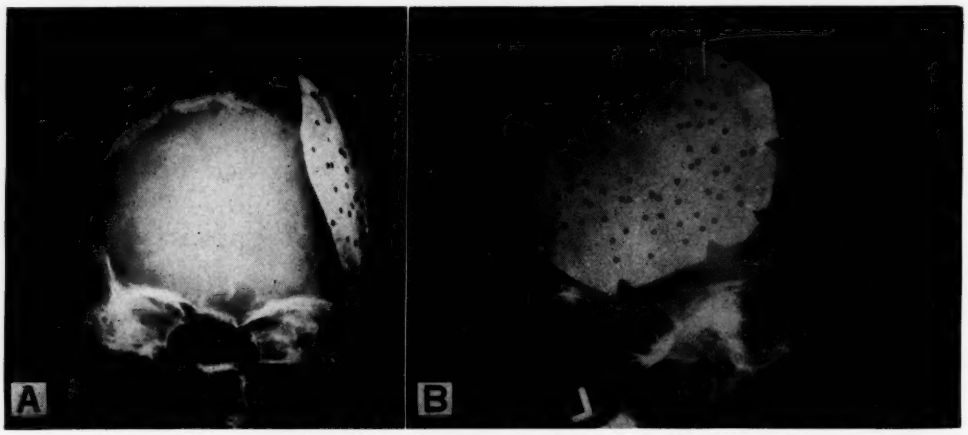


Fig. 4 (*Case 16*).—Plate in position. *A*, anterior view; *B*, lateral view.

TABLE 5.—*Diameter of Defect, Cm.*

Small (3-5)	10
Medium (5-10)	6
Large (over 10)	6

TABLE 6.—*Condition of Dura at Cranioplasty*

Found closed		16
Large defect not repaired		4*
Tumor	3	
Gunshot wound	1	
Small defect repaired		2
Galeal graft	1	
Suture	1	

*A persistent effusion over the plate occurred in 1 case only (see Table 1).

TABLE 7.—*Complications following Cranioplasty*

None		16
Effusion over plate (transitory)		3
Spontaneous absorption	1	
One aspiration	1	
Two aspirations	1	
Effusion (persistent—8 mo.)		1
Removal of plate*		2
Infection of scalp	1	
Persistent sinus due to thin scalp	1	
Mortality		0

*White[4] stated that complications from plates made of tantalum, vitallium or lucite occur in practically the same proportion of cases; their incidence amounted to 10.6 per cent in Elkins and Holbrook's series of 66 cranioplasties with lucite and in 12.3 per cent in 130 cranioplasties with tantalum.

Lewin and his associates[5] reviewed a two-year follow-up of 130 cranioplasties with tantalum and found that 11 plates (9 per cent) had to be removed; 5 because of infection, 4 for intracranial complications and 2 because of cosmetic failure.

Our incidence of 9 per cent plate removal with stainless steel compares favorably with the foregoing statistics.

TABLE 8.—*Duration of Follow-up*

No. of Cases	No. of Years
4	4 to 5
10	2 to 3
5	Less than 1
	Average—2.5 years

SUMMARY

1. Stainless steel cranioplasty has been done in 22 cases.

2. Two plates (9 per cent) had to be removed because of infection and sinus formation.

3. Nineteen of the patients have been followed an average of two and one-half years. In 1 patient a persistent effusion is present over the plate, owing to failure to close a large dural defect. The results have been entirely satisfactory in the remaining 18 cases.

TABLE 9.—*Results*

Plates inserted		22
Plates removed		2
Patients followed (average 2½ years)		19
Persistent effusion over plate		1
Clicking movement of plate		None
Discomfort over plate in extremes of weather		None
Convulsions relieved by cranioplasty		None
Convulsions produced by cranioplasty		None
Headaches relieved by cranioplasty		1
Vertigo relieved by cranioplasty		1
Cosmetic result		
Fair	4	
Good	15	

CONCLUSIONS

1. Experimental observations in animals by the authors and the clinical results obtained in this series of stainless steel cranioplasties show that this metal is as satisfactory as tantalum for the repair of cranial defects.

2. Since stainless steel can be cut, shaped and fitted at the operating table as easily as tantalum, and since the price of a tantalum plate 6 inches (15.24 cm.) square is $37 as compared with approximately 10 cents for a similar plate of stainless steel, the authors conclude that the use of tantalum for cranioplasty is wasteful and should be abandoned.

RÉSUMÉ

1. La cranioplastie à l'aide d'acier sans tache fut faite dans 22 cas.

2. Deux plaques (9%) furent enlevées dû à l'infection et la formation de sinus.

3. On a suivi 19 malades durant une période de deux ans et demi. Chez un malade, il y eut effusion persistante au-dessus de la plaque. Cela était dû à ce qu'on n'avait pas pû fermer complètement la plaie de la dure-

mère. Les résultats furent tres satisfaisants dans les autres cas (18).

CONCLUSIONS

1. Les observations expérimentales chez les animaux baites par les auteurs montrent que les résultats obtenus avec l'acier sans taches, sont aussi satisfaisants qu'avec le tantale, pour la rèparation des défauts craniens.

2. Vu que l'acier sans tache peut être coupé, modelé, faconné et ajusté au cours de l'operation, aussi facilement que le tantale et que le prix d'une plaque de tantale 6x6 pouces (15.24x15.24 Cm) est de 37 dollars tandis qu'une plaque de même dimension d'acier sans tache revien a dix sous, les auteurs considèrent que l'emploi du tantale pour cranioplastie est un gaspillage et doit être abandonné.

RESUMEN

1. Se hicieron 22 cranioplastías con acero inoxidable.

2. Hubo que retirar dos placas (9 por ciento) debido a infección y fistulización.

3. Se siguió a 19 de los pacientes por dos años y medio aproximadamente. En un paciente hubo efusión persistente sobre la placa, debida a defecto de cierre en una gran pérdida dural. Resultados enteramente satisfactorios en los 18 casos restantes.

CONCLUSIONES

1. Observaciones experimentales en animales y los resultados clínicos obtenidos en esta serie de cranioplastías con acero inoxidable, muestran que este metal es tan satisfactorio como el tántalo (tantalum) para la reparación de pérdidas craneales.

2. Dado que el acero inoxidable puede ser cortado, conformado y adaptado en la propia mesa de operaciones tan fácilmente como el tántalo (tantalum) y la gran diferencia de precio, pues una placa de tántalo de 6 por 6 pugadas (15.24 por 15.24 cm.) cuesta $37.00 (moneda de los Estados Unidos) en tanto que una similar de acero inoxidable importa 10 centavos (moneda de los Estados Unidos) aproximadamente, los autores concluyen que el uso del tántalo para cranioplastía es oneroso y debería abandonarse.

ZUSAMMENFASSUNG

1. Schaedelplastiken mit rostfreiem Stahl sind in zweiundzwanzig Faellen durchgefuehrt worden.

2. Zwei Platten (9%) mussten wegen Infektion und Fistelbildung entfernt werden.

3. Neunzehn der Kranken sind durchnittlich zweieinhalb Jahre lang beobachtet worden. In einem Fall besteht ein hartnaeckiger Erguss ueber der Platte als Folge mangnelhaften Verschlusses eines grossen Duradefekts. In den uebrigen achtzehn Faellen sind die Ergebnisse voellig zufriedenstellend.

SCHLUSSFOLGERUNGEN

1. Experimentelle Beobachtungen der Verfasser an Tieren und die in dieser Serie erzielten klinischen Ergebnisse mit rostfreiem Stahl bei Schaedelplastiken zeigen, dass dieses Metall zur Schliessung von Schaedeldefekten genau so befriedigend ist wie Tantalum.

2. Da rostfreies Stahl am Operationstisch genau so leicht wie Tantalum geschnitten, geformt und angepasst werden kann, und da der Preis fuer eine 15,24x15, 24 cm (6x6 Zoll) grosse Tantalumplatte 37 Dollar im Vergleich zu 10 Cent fuer eine aehnliche Platte aus rostfreiem Stahl kostet, kommen die Verfasser zu dem Schluss, dass die Anwendung von Tantalum in der Schaedelplastik eine Verschwendung darstellt und aufgegeben werden sollte.

RIASSUNTO

1. Vengono riportati 22 casi di cranioplastia con acciaio non corrosivo.

2. Due lamiere furano ritirati per causa d'infezione e formazione di seno.

3. Osservando 19 casi per una terminezza di 2½ anni, risulta in un soggetto effusione persistent al traverso la lamiera causato al fallimento della chiusura d'un diffetto durale largo. I risultati in 18 casi rimanente erano interamente soddisfacente.

CONCLUSIONE

1. Osservazione esperimentali negl' animali e risultati clinici dimostrano che in questa serie di cranioplastia con acciaio non corrosivo questo metallo e' egualmente soddisfacente che Tantalo nel riparo dei diffetti del cranio.

Fig. 5 (*Case 18*).—Hyperostosing meningioma of right frontal, parietal and temporal bone. *A* and *B*, before operation. Note mass in right frontal area. *C* and *D*, after removal of tumor and insertion of plate.

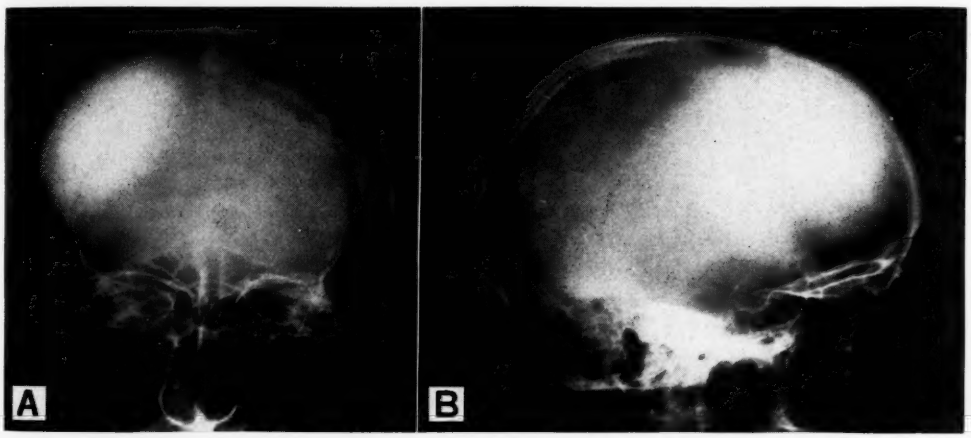


Fig. 6 (*Case 18*).—Roentgenograms showing tumor. *A*, anterior view; *B*, lateral view.

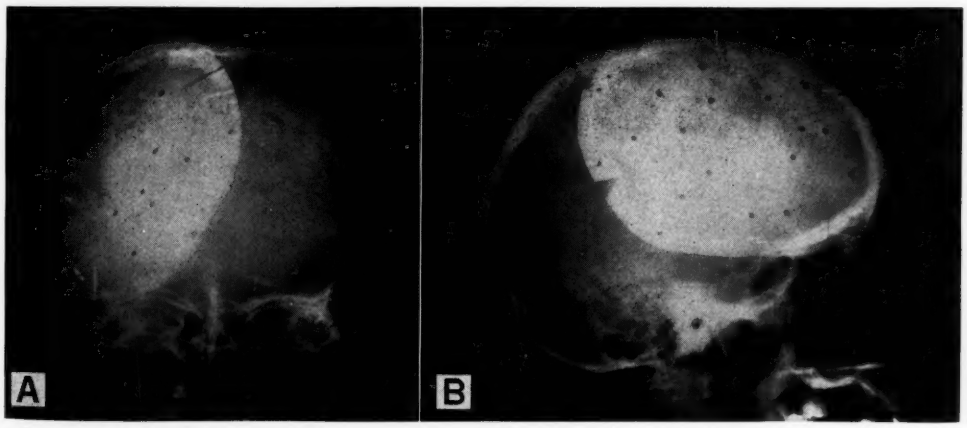
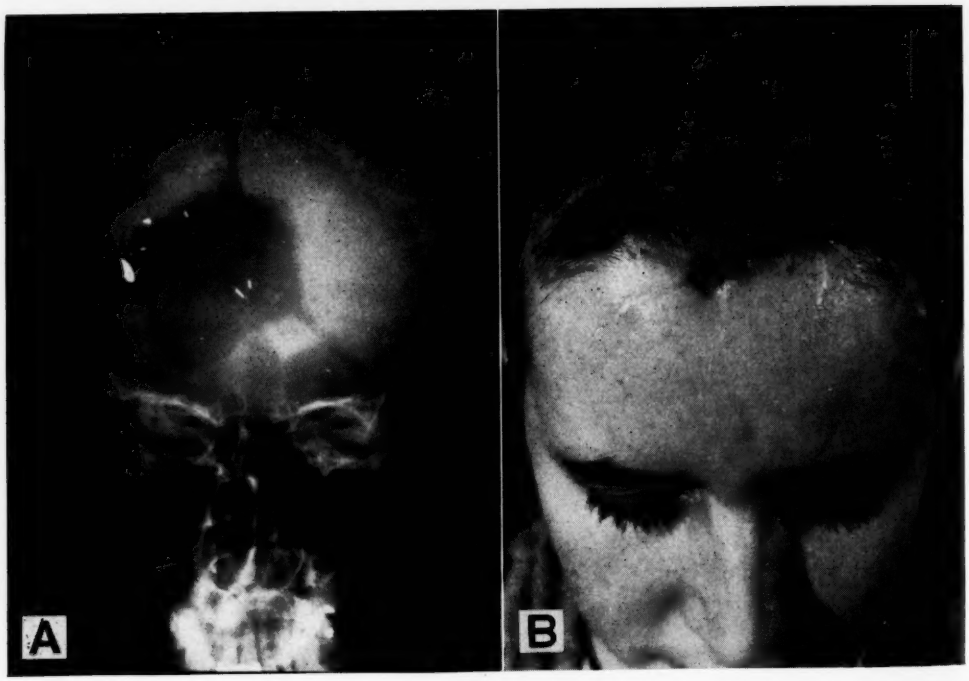


Fig. 7 (*Case 18*).—Roentgenograms showing plate in place. *A*, anterior view; *B*, lateral view.


A
B

2. Poiche' l'acciaio non corrosivo si taglia, si forma, e si adatta sulla tavola operativo cosi' facile come il Tantalo; e siccome il prezzo della lamiera di Tantalo 15.24cm per 15.24cm costa $37 a paragone d'una lamiera d'acciaio non corrosivo simile, valuto a vicino 10 centesimi, si conchiude che l'uso del Tantalo sia stravagante e bisogno abbandonarlo. L'A pone in evidenza i vantaggi economici nel impiego d'acciaio non corrosivo.

REFERENCES

1. Babcock, W. W.: Catgut Allergy, with a Note on the Use of Alloy Steel Wire for Sutures and Ligatures, Am. J. Surg. **27**:67-70, 1935.

2. Scott, M., and Wycis, H. T.: Experimental Observations on the Use of Stainless Steel for Cranioplasty, J. Neurosurg. **3**:310-317, 1946.

3. Gardner, W. J.: Closure of Defects of Skull with Tantalum, Surg., Gynec. & Obst. **80**:303, 1945.

4. White, J. C.: Late Complications Following Cranioplasty with Alloplastic Plates, Ann. Surg. **128**: 743, 1948.

5. Lewin, W.; Graham, M.P., and Northeroft, G. B.: Tantalum in the Repair of Traumatic Skull Defects, Brit. J. Surg. **36**:26, 1948.

6. Boldrey, E.: Stainless Steel Wire Mesh in the Repair of Skull Defects. Presented by title at a meeting of American Academy of Neurological Surgery, Sept. 7, 1944.

Fig. 8 (*Case 18*, opposite).—Photograph of gross specimen. Note invasion of dura.

Fig. 9 (*Case 9*, opposite).—Suicide attempt with shotgun, resulting in compound fracture of frontal bone and bilateral prefrontal lobotomy by the missile. The photographs show the cosmetic defect after removal of shattered bone and primary repair. *A*, roentgenogram of defect. *B*, persistent sinus due to excessive thinness of scalp, resulting in removal of plate (see text).

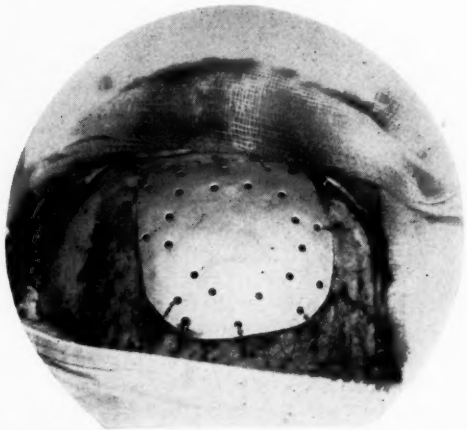


Fig. 10 (*Case 9*).—Plate inserted at second operation.

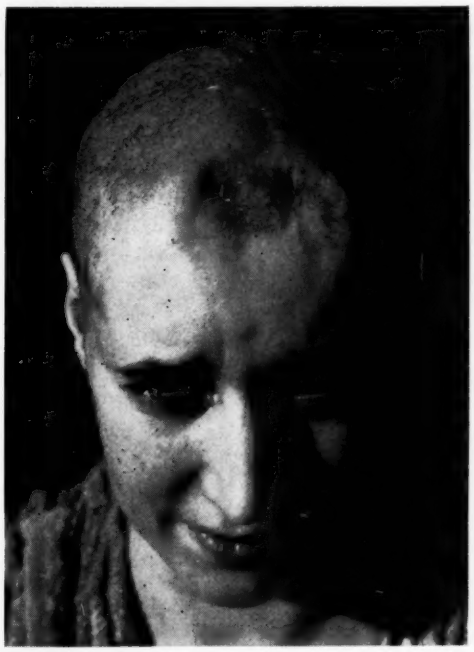


Fig. 11 (*Case 9*).—Outward appearance of defect.

The Education of the Biliary Surgeon

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IN the training of the young surgeon it is sometimes difficult to give him, or to see that he gets, a reasonably rounded perspective of the many problems he will face. This is true especially of surgery of the biliary tract. Lord Moynihan once said that no one should do biliary operations until he has had much surgical experience. How, then, is a young surgeon to learn biliary surgery? It is impossible to give all the trainees sufficient personal experience to familiarize themselves with most or all of the varied problems in this important field. We, as teachers, must by example and precept complete this education.

To learn the important day-by-day problems in biliary surgery I have analyzed from my files 100 consecutive operative cases of disease of the biliary tract. Many interesting points became apparent, but I have chosen for this discussion only those controversial aspects a young surgeon, and indeed all of us worry about.

Age and Sex: The series included 168 women with an average age of 49 years and 32 men with an average age of 51.4 years. Five women and 1 man were under 30, the youngest patient with gallstones being 22.

Symptoms: The average duration of symptoms prior to operation was four and seven-tenths years. It is interesting that all of the patients who had had symptoms for many years did not seek surgical relief until recurrent colic or some complication forced them to do so. Eighty-one of the patients had a colicky type of pain. Thirteen were jaundiced when first seen, and 6 had histories of recurrent icterus.

Roentgen Examinations: Cholecystograms were taken of 94 patients. A nonvisualizing gallbladder without stones was reported in 36. In 30 of these patients stones were present at operation. Stones were not found in 5 of these patients, but there was other local pathologic change. In only 1 patient were the operative observations (there was mild catarrhal cholecystitis) insufficient to explain the nonvisualization of the gallbladder preoperatively. This shows that a nonvisualizing gallbladder coupled with an adequate history of gallbladder disease almost always means gallstones or a functionless gallbladder.

Diagnosis: The main decision, as in all surgery, is whether exploration should be undertaken. In this series there were seven diagnostic errors (Table 1). With 5 of these patients the error was of no practical importance, because surgical intervention was of benefit. The sixth patient was a 54-year-old woman with a four-year history of pain in the right upper abdominal quadrant, with the usual symptoms suggesting disease of the gallbladder. Three cholecystograms at intervals revealed either a poorly functioning or a nonvisualizing gallbladder without stones. At operation a moderately thick-walled gallbladder without stones, a thin-walled dilated common duct without stones and a tight sphincter were observed. A diagnosis of biliary dyskinesia appeared clear. The seventh patient was a 73-year-old man in whom jaundice and ascites developed four months after a burn of 20 per cent of his body surface. The pathologist reported that the ascitic fluid showed some abnormal cells and that tumor could not be excluded. Although there was evidence to uphold the diagnosis of stone, cancer or serum hepatitis, operation was undertaken in the hope of relieving the jaundice if it were due to malignant obstruction. Hepatitis was present, and the subsequent course of the patient upheld that diagnosis.

Pathologic Picture: Eighty-four of the patients had stones in the gallbladder, in the common duct, or in both (Table 2). Thus, the most common problem confronting the biliary surgeon is the treatment of stones and the complications to which they lead. One ever-present problem is what to do with the patient with a functioning gallbladder containing a

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TABLE 1.—*Diagnostic Errors*

Preoperative Diagnosis	*Postoperative Diagnosis*
Cancer pancreas	Cancer of liver
Chronic cholecystic disease with stones	Chronic cholecystitis with polyp and hepatitis
Chronic cholecystic disease with stones	Cholesterosis
Acute cholecystitis	Pancreatitis
Perforated duodenal ulcer	Acute cholecystic disease
Chronic cholecystic disease with probable stones	Dyskinesia
Obstructive jaundice	Hepatitis

single stone too large to pass into the common duct. In this series 4 gallbladders with acute cystic duct obstruction due to one large stone, and 2 chronically infected gallbladders containing one large stone causing recurrent obstruction of the cystic duct were removed, with resultant cure.

Two patients with primary acute bacterial cholecystitis without stones were encountered.

There were 4 patients with primary carcinoma of the pancreas, and 1 with primary carcinoma of the liver. One patient had serum hepatitis, and 1 had primary pancreatitis.

Surgical Treatment: In the approach to the gallbladder a variety of incisions was used. A right rectus muscle-splitting incision was made in 76 patients, a subcostal or transverse incision in 23 and a paramedian incision in 1. The choice of incision usually depended on the obliquity of the costal margin. When it was wide a transverse or subcostal incision was used, and when the margin was more vertical than horizontal a right rectus incision gave better exposure. A partial wound separation occurred once, and a complete dehiscence once, both of them with right rectus muscle-splitting incisions.

TABLE 2.—*Pathologic Observations*

Gallstones in gallbladder and/or common duct	84
Polyp of gallbladder	1
Primary bacterial cholecystitis	2
Primary cancer of pancreas	4
Primary cancer of liver	1
Primary pancreatitis	1
Primary hepatitis	1
Miscellaneous	6

TABLE 3.—*Surgical Observations*

Cholecystectomy	92
Exploration of common duct	33
Common duct stones with jaundice	6
Common duct stones without jaundice	11
Abnormality of duct	7
Abnormality of vessel	10
Resection of head of pancreas	1
Emergency cholecystectomy	15
Cholecystogastrostomy or duodenostomy	3
Incidental appendectomy	36

The most common operation was cholecystectomy (Table 3). This procedure was performed usually by dissecting the cystic duct and artery first, and removing the gallbladder from below upward. Retrograde removal was done more often for acutely inflamed gallbladders, and a combination of the two approaches was used when indicated. Removal of the anterior wall of the gallbladder with cauterization of the wall embedded in the liver was done once. Thirty-three common ducts were explored because of jaundice or dilatation. Stones were found in the common duct in 17 patients, but only 6 of the patients had had jaundice. Thus, there were 11 cases of so-called "silent common duct stones." This important point cannot be stressed too strongly. The stones were felt in only 2 of the cases, which indicates that palpation cannot be relied upon to help the surgeon decide to open the common duct. In 2 patients the common duct was explored after a previous cholecystectomy.

Abnormalities of the extrahepatic duct system were demonstrated in 7 cases. Variations of the vessel distribution were present in 10.

One resection of the head of the pancreas was performed for cancer, with recovery. Cholecystogastrostomy or cholecystoduodenostomy was done in 3 cases.

Fifteen gallbladders were removed as emergency procedures. The duration of symptoms was forty-eight to seventy-two hours. All patients recovered.

Incidental appendectomy was performed in 36 cases, without complications.

Operative cholangiograms were taken 4 times. Although surgeons should know the technic and interpretation of operative cholangiography, it is doubtful whether the surgeon doing an occasional gallbladder operation should attempt it. Its greatest benefits are in deciding whether to open the common duct and, after exploration, whether all stones have been removed. On the other hand, postoperative cholangiograms should always be taken before removal of the drainage tube, and this procedure was carried out in this series. Of the 33 common ducts explored, postoperative cholangiograms showed shadows suggesting residual stone or stones in 5. The patients were treated with cholagogues and antispasmodics and in addition were given instillations of ether. Since second cholangiograms showed a normal biliary tract, it is impossible to say whether the shadows were due to trapped air or to stones which passed into the duodenum under treatment.

Mortality: There was no surgical mortality. All of the patients with cancer of the pancreas or liver were dead within twelve months.

Complications: Postoperative complications occurred in 18 patients. The complications were mostly those which follow any major operation. Mild jaundice, probably due to edema and clearing in a few days, occurred twice. Hemorrhage into the bile and urine occurred once. Severe acidosis occurred once, and was due to loss of alkaline bile secondary to cholorrhea. The final important complication was the premature accidental removal of the T-tube by the patient or nurse. This occurred three times, on the seventh, ninth and tenth days respectively, but fortunately did not interfere with the patient's recovery.

SUMMARY

From this analysis there arise certain points which should be taught the surgical student:

1. Gallstones do occur in persons under 30 and should be considered in the differential diagnosis.
2. The two most important symptoms are pain and jaundice, either separately or together.
3. A gallbladder that cannot be visualized by cholecystogram, together with an adequate clinical history, in almost all cases means the presence of gallstones.
4. The exact diagnosis of disease of the biliary tract is difficult. If it is believed that exploration will benefit the patient and if there are no absolute contraindications, operate.
5. Other things being equal, the presence of gallstones is an indication for surgical intervention. This is true whether one stone or multiple stones are present and regardless of size.
6. Use the incision which gives the best exposure.
7. Removal of the gallbladder in an early stage of acute disease gives as good results as appendectomy for acute appendicitis.
8. The most common operation is cholecystectomy. The several methods of removing the gallbladder should be taught. Cholecystostomy was not done in this series. It should be reserved for the patient who is a very poor risk.
9. The common duct should be explored on any reasonable indication. Stones can be present in the common duct with or without pain and/or jaundice. It is better to explore without results than to operate.
10. Consider possible abnormalities of the duct and vessel systems. Expose adequately and dissect gently.
11. Know about and use cholangiographic procedures, both operative and postoperative, when indicated.

SUMMARY AND CONCLUSIONS

One hundred operative cases of disease of the biliary tract encountered in a private surgical practice are presented and analyzed. The answers to controversial problems as noted in these cases are given. Pasteur and Lister made surgery safe for the patient. During the past twenty-five years the better understanding of physiology has helped to make the patient safe for surgery. By never-ending attention to the teaching of the young surgeon, we must complete the cycle and continue to make the surgeon safe for both the patient and surgery.

RÉSUMÉ

L'auteur présente et analyse 100 cas qu'il a operés de maladie de la région biliaire. Ces cas

furent rencontrés dans une pratique chirurgicale privée et sont d'une importance particulière pour l'étudiant de chirurgie. Ces cas sont nombreaux et méritent d'être discutés. Les calculs biliaires se rencontrent souvent chez les personnes âgées de moins de trente ans. Une vésicule biliaire qui ne peut pas être visualisée par une cholecystogramme presque toujours indique des calculs biliquires à moins qu'il n'y ait contradiction par les faits cliniques. La présence des calculs biliaires indique une intervention chirurgicale. Dans l'opinion de l'auteur, l'ablation de la vésicule biliaire dans la maladie aiguë de cette organe donne des résultats aussi satisfaisants que l'appendectomie dans l'appendicite aiguë.

ZUSAMMENFASSUNG

Der Verfasser berichtet und analysiert hundert operative Faelle von Erkrankungen der Gallenwege aus seiner chirurgischen Privatpraxis. Er hebt einige Punkte hervor, die ihm von besonderer Wichtigkeit fuer den chirurgischen Forscher zu sein scheinen. Dazu gehoeren die Tatsache, dass Gallensteine im Alter von unter dreissig Jahren auftreten koennen, und die Beobachtung, dass Gallenblasen, die sich durch die Cholecystographie nicht darstellen lassen, fast immer auf die Anwesenheit von Steinen hinweisen, es sei denn, dass die Krankheitsgeschichte dagegen spricht.

Er betont ferner, dass im allgemeinen das Vorhanden sein von Gallensteinen eine Indikation zum chirurgischen Eingriff darstellt, und vertritt die Meinung, dass bei akuter Erkrankung die fruehzeitige Entfernung der Gallenblase ebenso guenstige Resultate zeigt wie die Entfernung des Blinddarms bei akuter Appendizitis.

RIASSUNTO

L'A. presenta ed analizza 100 casi operatorie di malattia delle vie biliari riscontrati nella clientela chirurgica privata. Punti d'importanza particolari al studente chirurgicale sono catalogati ed accentuati, frattanto il fatto che calcoli biliari possono presentarsi nelle persone al di sotto di 30 anni; che la cistifellea che non si dimostra con la colecistografia, fuorché vi sia contra-indicazione anammesi, quasi sempre indica calcoli biliari; e benché, tutto sia uguale, la presenza di calcoli biliari propone l'intervento chirurgica. Nell'opinione delA. l'estirpazione della cistifella, ad una fase precoce della malattia risulta egualmente buono che l'appendectomia per l'appendicite acuta.

The wish that anything may be true, powerfully influences the mind toward finding it true. A researcher in pure science is usually far less influenced by prejudices and wishes than is the investigator who is aware of the practical results of his findings. Even the pure scientist is, however, likely to be prejudiced in favor of a theory that he himself has proposed or espoused. His reputation depends upon its being verified, hence in his selection of facts and interpretation of results, he is unconsciously prejudiced. This tendency to error has, however, a natural corrective. Other scientists may make their reputation by finding defects in old theories and in proving new ones. It has now become a recognized principle that evidence of the truth of a theory presented by one man cannot be accepted as reliable, even as to the facts given in its support, until others have made the same observations and experiments with the same results. This is especially required when the facts reported seem not in harmony with well-established theories.—*Edwin A. Kirkpatrick*

Thrombocytopenia Purpura

A Review of Fifty-Three Cases

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THIS paper deals especially with the hypersplenic disease idiopathic thrombocytopenia purpura—a condition caused, according to present concepts, by some abnormal function of the spleen, either by destruction and phagocytosis of platelets therein or by some remote humoral effect upon the megakaryocytes in the bone marrow. The disease may be cured by splenectomy in many instances, but the results of this procedure are often most discouraging. Thrombocytopenic purpura is a treacherous disease, often fatal when there is persistent severe thrombopenia associated with hemorrhagic manifestations.

A universal physical sign of idiopathic or secondary thrombocytopenia is ecchymosis of the skin and capillary or frank bleeding from the mucous membranes and serous surfaces. Blood transfusions are used to replace the lost blood. In a number of cases of idiopathic thrombocytopenic purpura spontaneous regression occurs, particularly in patients of the younger age group. Others fail to respond spontaneously, and on these splenectomy has been performed. In selecting cases for operation, careful analysis should be made of the complex factors involved in hemostasis and hemopoiesis. Among these factors the following, when present, are considered generally as offering a good prognosis in the event of splenectomy: (*1*) a not too severe type of anemia, readily combated by transfusions; (*2*) a normal or elevated neutrophil count in the peripheral blood; (*3*) hyperplastic bone marrow in which megakaryocytes are plentiful and mature, and (*4*) a high eosinophilic index.

In a certain number of conditions diagnosed as idiopathic thrombocytopenia purpura and presumably satisfying all or most of the above criteria it is common to find no improvement after operation, and even death may occur postoperatively. Percentages of cure following splenectomy vary with different authors.

Our experience in the past sixteen years has been derived from a review of 53 cases.

1. Of the 53 cases reviewed in our hospital files, conditions in 41 were found to be compatible with the diagnosis of thrombocytopenic purpura.

2. Of these 41 cases, 23 met all hematologic criteria of history, physical data and laboratory evidence to substantiate the diagnosis of primary idiopathic thrombocytopenic purpura. There were 15 female and 8 male patients in this group. The age range was 2 to 63.

3. There were 19 cases of secondary purpura due to drug reactions or allergic sensitivity or secondary to malignant disease or leukemia.

4. Of the 23 patients, 11 came to operation and 12 did not. Of the 11 patients who underwent operation, 6 died; 5 were cured or definitely improved. Of the 6 patients who died, 4 presented clinical and hematologic data offering a poor prognosis. Splenectomy was performed with the hope of a favorable ultimate outcome.

5. Further analysis of the cases shows that female patients below the age of 25 appear to have the best spontaneous improvement rate. They are the best operative risks, whereas older male patients with a history of hemorrhage and prolonged bleeding time appear to be the worst risks. In fact, of the 12 patients not operated upon, 7 showed spontaneous improvement, all were below 19 years of age (4 girls and 3 boys).

When the bone marrow shows no evidence of maturation of immature megakaryocytes and delivery of mature platelets into the peripheral

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circulation without any apparent cause, the diagnosis of idiopathic or primary thrombocytopenic purpura is maintained. This type of condition may lead to a severe hemorrhagic diathesis and such sequelae as hematuria, epistaxis, menorrhagia, and bleeding from mucous and serous surfaces, which, if persistent may result in death. However, when surgical intervention is indicated it is important to remove the spleen and all accessory splenic tissue to prevent a recurrence of the condition. One patient presented six accessory spleens in addition to the normal spleen. This is also true in cases of hypersplenism associated with hemolytic anemia and panhematocytopenia. In the latter an overactive bone marrow apparently compensates for increased destruction of mature elements in the circulating blood.

It is now essential in the treatment of all blood dyscrasias to include a hematologist in the team. A bone marrow biopsy is an important examination leading to a knowledge of the megakaryocytes. When they are immature and insufficient, a rather definite diagnosis and prognosis can be made. According to Welch and Dameshek, the spleen normally has some control over the bone marrow. For the best operative results in a case of thrombocytopenia purpura there should be an abundance of megakaryocytes.

The spleen is not necessary for normal human life. It has been proved many times after traumatic rupture of the spleen, an accidental injury requiring its removal, that the patient may lead a healthy existence. The irony of all this is the fact that when the spleen becomes pathologic it can do great harm and even destroy life. Doan stated that the spleen is physiologically an unstable organ but pathologically an important one. The reason for this change is not easily explained. When the spleen destroys too many red blood cells the result is the condition known as hemolytic jaundice. When it destroys too many or all of the platelets in the blood, thrombocytopenia follows.

The indications for operation in cases of hypersplenism have narrowed materially in the past few years. They are congenital and acquired hemolytic icterus; idiopathic thrombocytopenic purpura (with criteria as aforementioned); tumors; chronic hemolytic anemia, and panhematocytopenia and neutropenia with a hyperplastic bone marrow picture. Our results show that patients in the older age groups with initially low platelet levels had poor operative responses. These patients showed no postoperative rise in platelets and no clinical improvement after the spleen was removed. The majority of fatalities occurred within ninety-six hours after the operation.

The abdominal route was used for all splenectomies performed for any of the blood dyscrasias mentioned. Usually a left rectus incision was employed. Perfect hemostasis is necessary for operation upon thrombocytopenic patients. We have not found it necessary to employ the thoracoabdominal approach for these patients, because the spleen is usually mobilized readily through an abdominal incision.

The relation of the degree of morbidity to platelet levels does appear to be a factor of importance in prognosticating the outcome of splenectomy. In the experience of one of us, if the patient has an initial average of 80,000 to 100,000 platelets the prognosis appears to be better than for a patient with an initial level of 20,000 or less. The platelet level varies with the technician, particularly at these low levels, and an accurate count by a reliable technician is essential. When the platelet level is low the mortality increases, and in the presence of a low platelet level the other criteria mentioned should be most carefully considered before the patient is accepted for splenectomy.

Fifty-three cases in which a diagnosis of thrombocytopenia purpura had been made were reviewed. Of these, more than half were discarded because they did not fulfill all the diagnostic criteria for thrombocytopenia.

All followed a somewhat uniform pattern; there was bleeding from some structure, such as a lining mucous membrane, or the bleeding took the form of petechiae scattered irregularly over the surface of the skin. Bleeding originated in the form of hematemesis, epistaxis, tarry stools or oral and uterine hemorrhages.

The blood exuded may be in small quantities or large enough to constitute a hemorrhage. In the terminal states there are massive hemorrhages which may fill the pleural sac, the subdural and subarachnoid spaces, the abdominal cavity and many organs of the body,

such as the kidneys, liver and other solid structures.

The most favorable cases were those in which the bone marrow showed megakaryocytic activity. When no megakaryocytes or only a few were present, the patients were always in considerable danger with or without operation. After operation, without megakaryocytes, death resulted from splenectomy in a few hours to a week. The lesson learned was that without an active bone marrow splenectomy should not be performed.

Some interesting premonitory phenomena were developed, but without a blood count paying particular attention to the number of platelets the diagnosis of thrombocytopenia purpura could not have been made. In many of these patients the spleen was not enlarged. The fragility test was of some importance in helping to make the diagnosis, showing increased resistance in most cases.

One outstanding recovery was that of a 14-year-old girl with menorrhagia. This was her only symptom. She had a deficiency of blood platelets. After the spleen was removed, the platelet count advanced to 800,000 in two months.

A woman, after hysterectomy, bled almost continuously from the incision in the vagina. A blood count showed a marked reduction in blood platelets. After a stormy convalescence, splenectomy finally restored her to health.

A revealing fact is that one-third of the patients accepted were children of ages ranging from 2 to 14 years. In addition, there were several adolescents. Spontaneous recovery was the rule for this group. The overall age range was from 2 to 63 years.

Thrombocytopenia purpura develops more often in the female than in the male, but with a better incidence of recovery.

SUMMARY AND CONCLUSIONS

1. This paper considers the hypersplenic disease thrombocytopenia purpura, the exact cause of which is not known.

2. The symptoms of the idiopathic and secondary types are identical.

3. Some patients in the younger age groups recover spontaneously.

4. A good prognosis after splenectomy depends on certain criteria, which are discussed.

5. A brief review of 53 cases is included.

6. It is important to remove all accessory spleens in addition to the spleen itself. In 1 patient six accessory spleens were removed.

7. In these days of specialization it is important to have a hematologist associated with the internist and the surgeon.

8. Curiously enough, the spleen is not essential to normal health but when it becomes pathologic it is a dangerous organ.

9. The indications for splenectomy have narrowed considerably in the past few years.

10. The results have been discouraging for patients with low platelet counts.

11. All splenectomies in this particular group were done by the abdominal route.

RÉSUMÉ

1. Les auteurs discutent la maladie hypersplénique purpura thrombocytopénique; la cause exacte de cette maladie n'est pas connue.

2. Les symptômes des formes idiopatiques et secondaires sont identiques.

3. Les malades d'âge peu avancé se rétablissent spontanément.

4. Un bon pronostic après la splenectomie dépend sur certains critères, que l'auteur discute.

5. Une revue brève de 53 cas étudiés est incluse.

6. Il est important de faire l'ablatiom de toute rate accessoire ainsi que de la rate. Dans un cas de cette serie, on enleva 6 rates accessoires.

7. A notre âge de spécialisation, il est bon d'associer un hématologiste avec l'interniste et le chirurgien.

8. Quoique la rate ne soit pas essentielle pour la santé normale, quand elle est pathologique, elle présente un grand danger.

9. Dans les dernières anneés, les indications pour la splénectomie sont moins nombreuses.

10. Les résultats chez les malades dont les plaquettes sanguines sont diminuées sont decourageants.

11. Toute splénectomie de cette série fut faite par la voie abdominale.

ZUSAMMENFASSUNG UND SCHLUSSFOLGERUNGEN

1. Die Verfasser eroertern die thrombozy-

topenische Purpura, eine hyperplenische Erkrankung, deren genaue Ursache unbekannt ist.

2. Die Symptome der idiopathischen und der sekundaeren Form der Erkrankung sind die gleichen.

3. Manche Kranke der juengeren Altersgruppen genesen von selbst.

4. Eine gute Prognose nach Resektion der Milz haengt von gewissen Kriterien ab, die in dieser Arbeit eroertert werden.

5. Ein kurzer Ueberblick ueber die 53 eroerterten Faelle ist eingeschlossen.

6. Es ist wichtig, ausser der eigentlichen Milz alle ueberzaehligen Milzen zu entfernen. In einem Falle dieser Serie wurden 6 ueberzaehlige Milzen reseziert.

7. In unserem Zeitalter der Spezialisierung ist die Zusammenarbeit des Haematologen mit dem Internisten und dem Chirurgen von Wichtigkeit.

8. Die Milz, die zwar zur Erhaltung des normalen Gesundheitszustandes nicht unentbehrlich ist, stellt doch, wenn sie erkrankt ist, eine Gefahr dar.

9. Die Indikationen zur Resektion der Milz sind in den vergangenen letzten Jahren erheblich eingeengt worden.

10. Bei Kranken mit einer niedrigen Blutplaettchenzahl sind die Erfolge entmutigend.

11. Alle Milzresektionen in dieser Serie wurden auf abdominalem Wege durchgefuehrt.

RIASSUNTO E CONCLUSIONI

1. L'AA. discutono purpura trombocitopenia, malattia ipersplenica; la causa esatta la quale non e'conosiuta.

2. I sintomi dei tipi idiopatici e secondari sono identici.

3. Ce ne sono dei pazienti nel'gruppo piu giovane che ricuperano spontaneamente.

4. Una buona prognosi postsplenectomia dipende su certi criteri, i quali sono discussi in questo articolo.

5. Una breve rivista di 53 casi considerati e' rinchiuso.

6. E' importante il rimovimento di tutte milze accessorie in aumento della milza se stessa. In 1 caso in questa serie sei milze accessorie furono rimossi.

7. In questi giorni di specialita' bisogna avere un ematologista associato col internista ed chirurgo.

8. Benche' la milza non e' essenziale alla salute normale, quando diviene patologica, la sua presenza e' pericolosa.

9. Le indicazioni per splenectomia hanno considerabile ristringimento do pochi anni passati.

10. I risultati nei pazienti con conto basso delle piastrine sono stati sconfortanti.

11. Tutte le splenectomie in questa serie sono state per via addominale.

REFERENCES

Welch, C. S., and Dameshek, W.: Splenectomy in Blood Dyscrasias, New England J. Med. **242**:601-606, 1950.

Doan, C. A.: Hypersplenism, Bul. N. Y. Acad. Med. (second series) **25**:625-650, 1949.

Laënnec, even during his lifetime, was the recipient of many eulogies. Perhaps none touched him more than that of the great writer Chateaubriand, who said: "By means of a tube applied to the external parts of the body our learned Breton compatriot Dr. Laënnec has succeeded in recognizing by the quality of the sounds of respiration the nature of the diseases of the heart and of the chest. This beautiful and great discovery will mark an epoch in the history of the art. If one could invent a machine for hearing what takes place in a man's conscience, that would also be useful for the days in which we live. 'It is in his spirit that a physician should find remedies,' another physician has said in his ingenuous maxims, and the work of Dr. Laënnec proves the justness of this observation.—*Ralph H. Major, M.D.*

Transplantation of Psoas Muscle in Correction of Urinary Incontinence

FERDINANDO STEFANI, M.D.
ROVIGO, ITALY

NUMEROUS methods have been conceived for the surgical correction of urinary incontinence. It has been estimated that relatively a hundred procedures have been devised or considered for the correction of this condition. The purpose of every method is to create voluntary controllable evacuation of the urinary bladder. All these methods are plastic surgical procedures utilizing noncontractile tissue and/or striated muscle tissue to produce the desired sphincteric control. It has been repeatedly demonstrated that the faculty of closing the urethra is not effective in every instance. It is the purpose of this contribution to present a method permitting voluntary occlusion of the urethra dependent on contraction of psoas muscle.

Plastic procedures utilizing noncontractile tissues make use of fibrous structures existing near the urethra, and the end results are usually not satisfactory. Such a procedure frequently necessitates the use of certain surgical technics to create obstacles hindering the outward flow of urine from the bladder. These hindrances are produced by making the urethra longer, by twisting it on its axis or by occluding its opening. Plastic procedures utilizing noncontractile tissue do not completely obstruct the urethra; they are effective only when the sphincter is partially preserved. It has been repeatedly demonstrated that, when the sphincter is impaired or totally absent, urinary dribbling is constant even when the bladder is partially filled. In spite of the operation, therefore, it often becomes necessary to resort to various surgical appliances to prevent constant dribbling.

In contrast, a plastic procedure utilizing striated or contractile muscle tissue aims to close the urethral canal by compression of these muscles. This method should, in theory, produce more effective results than do methods utilizing noncontractile tissues, because of the normal contractability of the muscles employed. In some operations for correction of urinary dribbling the contractile muscle may be greatly displaced from its normal anatomic position; this tends to limit the effectiveness of the surgical procedure. The contractile function of this muscle tissue may be partially or completely destroyed as the result of displacement. Surgical trauma or impairment of innervation and/or nutrition may so hamper the transplanted muscle tissue as to render it functionless. Muscles lacking innervation and nutrition ultimately become transformed partially or wholly into fibrous cords incapable of compression of the urethra.

A method of correction of urinary incontinence was presented by me some years ago.* Research has continued until it is now believed that this method presents important advantages over others suggested for the correction of this condition. This technic was originally presented before the Societa Italiana di Urologia (Rome, 1947).

The procedure consists of two principal factors; first, utilization of the psoas minor muscle, and second, free transplantation of a strip of fascia lata from the thigh. The strip of fascia lata, 22 to 26 cm. long, is necessary to lengthen the tendon of the psoas muscle (Fig. 1). The tendon so lengthened is passed obliquely from above posteriorly to the symphysis pubis and is continued beneath that portion of the urethra which is located immediately beneath the symphysis, to be anchored by sutures to the tissue on the anterior surface of the symphysis on the opposite side. The urethra lies in the dependent portion of the elongated psoas tendon (Fig. 2). Contraction of the psoas muscle causes the urethra to be

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*"Un nuovo indirizzo operativo per la terapia di alcuni prolassi e ptosi," in Rivista Italiana di Terapia," 1932, No. 1.—"Sulla possibilita di accertare preventiamente l'esistenza del muscolo piccolo psoas in ordine alle operazioni id pessia." in "Rivista di Chirurgia," 1936, No. 6.

compressed against the inferior margin of the symphysis. Sufficient pressure is exerted on the urethra to prevent incontinence, yet the pressure is not sufficient to produce necrosis. The urethral compression, although vigorous, is not harmful or in any way destructive. It is suggested that adipose tissue be placed between the posterior aspect of the symphysis pubis and the strip of fascia lata to act as a buffer. The psoas minor muscle lying behind the peritoneum does not alter its direction of action in performing its new function.

I have performed this operation three times. In each instance excellent results were obtained.

This surgical procedure is done in a region of the body in which infection is commonplace and difficult to prevent. It is imperative to prevent postoperative infection. This applies also to all plastic procedures or tissue transplantations. However, in the method presented the tissues used are viable and have not been subjected to previous trauma. The procedure as described does not necessitate unusual displacement of the psoas muscle, so that innervation and nutrition remain normal. This last detail is very important.

The innervation of the psoas muscle arises from the first lumbar roots. The innervation of the muscle, which was used in earlier plastic procedures, is derived from the low lumbar or the sacral roots, as is the innervation of the bladder. Consequently, if vesical innervation is impaired, the muscle tissue whose innervation arises from relatively the same levels would likewise be subjected to some impairment.

One very important fact must be always considered: The psoas minor muscle may be absent. In such instances a portion of the psoas major may be used. In utilizing the psoas major muscle, particular attention must be given to preventing injury to the femoral nerve. Nor should a large enough portion of the muscle be used to interfere with normal function of the thigh.

It might be possible to obtain even greater pressure on the urethra by suturing the fascia lata to the abdominal muscles at the upper anterior margin of the symphysis pubis after it passes beneath the urethra. Or the fascia

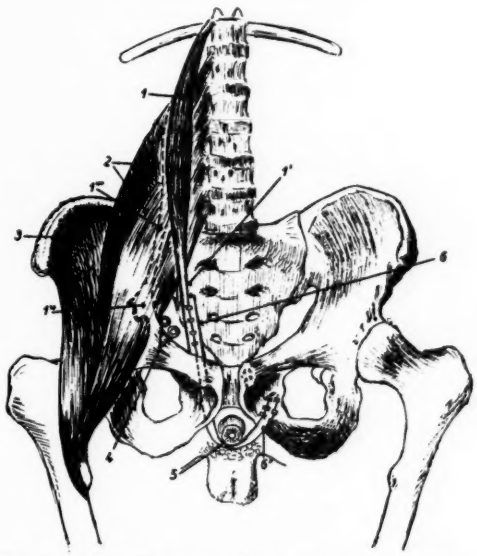

Fig. 1.—Schematic representation of operative results, anterior view. *1*, psoas minor muscle. *1'*, tendon of psoas minor muscle, displaced to middle and sutured to upper end of border of fascia lata. *1''*, natural insertion of psoas minor muscle. *1'''*, first situation of psoas minor muscle (dotted lines). *2*, psoas major muscle. *3*, iliac portion of iliopsoas muscle. *4*, outer iliac vessels. System of tendon of psoas minor muscle. Transplanted part of fascia lata takes middle position in respect to these vessels. *5*, urethra and adjoining organs. *6* and *6'*, transplanted part of fascia lata. Sutured from upper end (*6*) to tendon of psoas minor muscle, it descends behind pubis, forming a handle embracing urethra and adjoining structures; then ascends in front of pubis, near which its lower end (*6'*) is fixed by stitches.

lata could be placed in such a position as to increase compression by rotation of the urethra on its longitudinal axis. In my opinion these measures are technical excesses without real practical advantage. A greater effect from such utilization of the psoas muscle may be obtained by suturing the fascia lata, after it is passed beneath the urethra, to the upper anterior margin of the symphysis on the side from which the muscle was used. In this manner twisting of the urethra as well as compression would occur during muscle contraction. These factors seem, however, to be technicalities without practical advantage.

The indications for this procedure are many; the contraindications are few. It is believed, in fact, that there are no contraindi-

cations, except age, circulatory disturbance, general physical debility, poor nutrition and infection, that would prevent one from attaining a successful result. All these factors are considered in connection with any elective operative procedure. Psoas abscess associated with tuberculous infection of the spine definitely precludes this type of surgical intervention. Loss of both limbs by amputation would also preclude it, since the necessary strip of fascia would not be available. Any condition that causes serious alteration of the skin of the lower part of the abdomen would also be a contraindication.

The advantage of this type of surgical procedure is that muscle tissue is utilized without altering its normal functional action, and the nutrition and innervation of the muscle is preserved. The results are excellent. It is believed that such procedures should be used in all instances of urinary incontinence except those in which the condition is slight or relative, with the sphincteric function fairly well retained. Under these circumstances a satisfactory result may be obtained by simpler and less extensive procedures. However, failure of the simpler methods of intervention is believed to be a clear-cut indication for use of the psoas minor muscle. This is true particularly when further surgical intervention is considered. Locally the tissues and their relations are altered postoperatively, which would tend to prevent satisfactory results. It is believed that the selection and preference of any procedure should depend on the condition of the patient and the experience of the surgeon. By the results obtained it is believed that this procedure warrants its use whenever a plastic procedure for the correction of urinary incontinence is desired.

As has been stated, I have performed it on three occasions, in the last case about one year ago. In all 3 cases the results were satisfactory. The third patient, a woman in rather weak physical condition, presented a rather difficult problem. She complained of continuous urinary dribbling. The maximum vesical capacity was 20 cc. Owing to complete absence of the psoas minor muscle, it was necessary to use a portion of the psoas major. After the operation a hematoma developed at the site

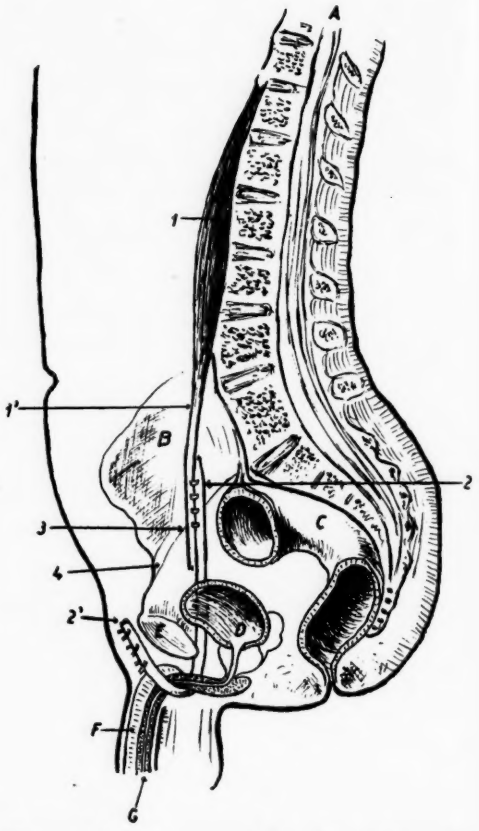

Fig. 2.—Schematic representation of operative results lateral view. *A*, rachis. *B*, iliac wing. *C*, rectum. *D*, urinary bladder. *E*, section of pubic symphysis. *F*, deep parts of penis. *G*, urethra and corpus spongiosa. *1*, psoas minor muscle; *1'*, tendon of psoas minor muscle sutured to part of fascia lata (*2*). *2* and *2'*, part of fascia lata sutured to *1'*, coming down *behind* pubis to form handle around urethra, then going up *in front* of pubis (from opposite side), where it is fixed. (Points of extremity (*2'*) touch only part of the fascia. This is a reminder that they involve tissues located in the opposite half of the pelvis, not represented in the drawing.) *3*, linea innominata. *4*, original anatomic insertion of tendon of psoas minor muscle.

of suture of the fascia lata, anterior to the symphysis. An abscess also developed in the gluteal area after a hyperdermic injection. With drainage and administration of antibiotics these areas healed without further complications. The vesical capacity is now 300 cc. (one year after the operation). The patient

is able to retain urine for four to five hours and voids without difficulty. There is no dribbling of urine.

It may seem premature, in view of the few patients operated on to suggest such a procedure, but it is hoped that other surgeons will make use of it in view of its therapeutic efficiency and its practical usefulness.

SUMMARY

The author briefly explains why the numerous methods, used for the treatment of urinary incontinence by restoring the faculty of closing the urethra are not always effective. Then, referring to his previous reports made to the Italian Urological Society at its Congress in Rome in 1947, he recalls how he operated satisfactorily in a few other cases by the method he suggests. This consists in making the occludibility of the urethra dependent on the contraction of voluntary muscles, the function and nutrition of which remain intact.

RÉSUMÉ

L'auteur décrit brièvement les nombreuses méthodes employées pour le traitement de l'incontinence urinaire afin de restaurer la faculté de fermer l'uréthre; ces methodes ne sont pas toujours efficaces. Faisant allusion à un rapport récent qu'il fit à la Société Urologique Italienne au Congrés de Rome en 1947, il rapporte comment il a opéré avec satisfaction plusieurs cas par la méthode qu'il recommande. Cette méthode consiste en obtenant l'occlusion de l'urèthre à l'aide de contraction des muscles volontaires dont la fonction et la nutrition restent intactes.

RIASSUNTO

L'A. spiega brevemente perche i metodi numerosi, impiegati nel trattamento della incontinenza orinario presso di ristabilire la facoltà della chiusura dell 'uretra, non sono sempre efficaci. Allora riguardo il rapporto pecedente alla Società Urologica Italiana al Congresso di Roma 1947, eglirichiama come ha operato con successo in altri pochi casi per la maniera suggerita. Cioè fare dipendere la chiusura dell 'uretra alla contrazione dei muscoli volontari, la funzione e nutrizione rimanendo intatto.

RESUMEN

El autor explica brevemente porqué los numerosos métodos terapéuticos para la incontinencia urinaria, restauradores de la facultad continente uretral, no son siempre efectivos. Hace referencia a este respecto de su comunicación anterior a la Sociedad Italiana de Urología, Congreso en Roma en 1947, recordando cuan satisfactorios han sido algunos otros casos operados por el método que él sugiere. Este consiste en hacer depender la continencia uretral de la contracción de los músculos voluntarios, cuya función y nutrición permanecen intactas.

ZUSAMMENFASSUNG

Der Verfasser erklaert in Kuerze, warum die zahlreichen, in der Wiederherstellung der Schliessfaehigkeit der Harnroehre bestehenden Behandlungsmethoden der Harninkontinenz nicht immer wirksam sind. Er beruft sich unter Bezugnahme auf seinen Bericht an die Italienische Urologische Gesellschaft auf dem Kongress in Rom in Jahre 1947-auf einige andere mit der von ihm vorgeschlagenen Methode erfolgreich operierte Faelle. Sein Verfahren besteht darin, die Schliessbarkeit der Harnroehre von der Kontraktion willkuerlicher Muskeln, deren Funktion und Ernaehrung intakt sind, abhaenig zu machen.

In the sphere of Nature's laws it is only the minimal things that are worth caring about . . . mere specks on the wall of Life, so it seems to you. But one sets one's eyes to them, and behold, they are chinks that look out on Infinity.—*Havelock Ellis*

The Cooper Ligament Operation for Inguinal Hernia

LEIGH F. WATSON, M.D., F.I.C.S.*
LOS ANGELES

WITH the Cooper ligament operation there has been a lower percentage of recurrences than with the inguinal ligament operation (Bassini); hence, this procedure is steadily supplanting the latter in popular favor among surgeons, although the Bassini procedure presents fewer technical difficulties.

Narath is believed to be the first to have sutured the internal oblique and transversalis fasciae to the Cooper ligament. Lotheissen in 1898 published the general details of the operation, which he considered the method best adapted to the femoral hernia region. He did not realize its full value for inguinal hernia.

It remained for Babcock to recognize the many advantages of suturing the fascia to Cooper's ligament. After using the operation for some time he published his technic and results in 1927 and called attention to the fact that suturing Cooper's ligament closed the area of greatest weakness, that is, the lower inner angle—the site of most recurrences.

Anson and McVay in 1938 published their studies on this subject together with the operative results secured by McVay.

This operation preserves the normal unhampered action of the fascia and muscles of the inguinal region. It is now known that the Bassini operation interferes with normal movement, thus weakening the lower part of the abdominal wall and favoring rather than preventing recurrence. Since the lower fibers of the transversalis and the internal oblique fasciae are normally attached to the fibrous covering of the pubic bone, the ligamentum pubicum superior (Cooper's ligament), and not to the inguinal ligament, it is logical to adopt the suggestion of Babcock and to suture the inferior aponeuroses of the internal oblique and the transversalis fascia to Cooper's ligament.

The reluctance of some surgeons to adopt this operation is due in part to their unfortunate experiences with nonabsorbable suture material or their unwise attempts to use nonabsorbable suture material as freely as if it were absorbable catgut. This operation is best carried out with silk or cotton sutures, thus involving a special technic. Material of the smallest size is to be preferred; stitches should not be too close together; continuous sutures should never be employed; all ties and knots should be cut short so as to leave a minimum amount of nonabsorbable material in the wound, and ligatures should be used sparingly.

Cutaneous Incision.—A straight incision is made nearly parallel with the inguinal ligament and ½ inch (1.25 cm.) above, extending from the internal ring to the lower middle part of the external ring and, in large hernias, to the upper middle part of the scrotum, just below the external ring. The length of this incision should be 2 to 3 inches (5 to 7.5 cm.) in children and 3 to 4 inches (7.5 to 10 cm.) in adults.

When the incision is deepened, the superficial epigastric and superficial circumflex iliac veins are seen crossing the field. These veins should be picked up and divided between hemostats. Some surgeons prefer to ligate them at once with fine silk or cotton. However, I do not like to leave ligatures in the fat; I prefer to let the forceps remain in place until the operation is finished, at which time they can be removed without causing further bleeding, provided that the wound is not roughly wiped with gauze and the terminal clots are not loosened.

To expose Cooper's ligament properly the incision must be extended considerably lower than that used with the inguinal ligament (Bassini) operation. It should curve downward to the upper part of the scrotum.

Aponeurosis of External Oblique.—After freely exposing the aponeurosis, one should

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locate the external ring. If this external ring is not visible, it can be found by palpating the cord where it crosses the pubic bone as it leaves the external ring, and by following the cord upward with a director or other blunt instrument. If infiltration anesthesia is used, the aponeurosis is exposed and the injection made therein at the upper end of the proposed line of incision.

The aponeurosis is now incised in the direction of its fibers from a point near the internal ring to the external ring, and if the operation is done with infiltration anesthesia the next step is to locate the ilioinguinal and iliohypogastric nerves and to block them at as high a level as possible. The incision should be made as far from the inguinal ligament as is practical, so as to provide a wide upper flap for overlapping when the wound is closed. It is always advisable to cut through the pillars of the external ring, as this facilitates resection of the sac and repair of the canal. Some surgeons prefer to cut the aponeurosis on a grooved director inserted upward through the external ring for a distance of 2 to 3 inches (5 to 7.5 cm.), a practice to be condemned because of the danger of cutting the ilioinguinal nerve. A better method is to nick the aponeurosis near the internal ring and cautiously divide it in the direction of its fibers until the external ring is reached.

Dissection of the Aponeurosis and Anterior Rectus Sheath.—The inner edge of the external oblique fascia is retracted. On the medial side the dissection is continued until the arching of the internal oblique is seen. The rectus muscle and the fascia are exposed. On the outer side the dissection is continued until the inner shelving margin of the inguinal ligament is well exposed for a distance of 2 to 3 inches (5 to 7.5 cm.), down to the pubic tubercle.

On the medial side the inner layer of the anterior rectus sheath is exposed and split for a distance of 2 to 4 inches (5 to 10 cm.) to within ½ inch (1.25 cm.) of the pubic spine. The internal oblique muscle should be cut merely to the outer side of the linea alba, which it forms along with the external oblique. This makes it possible to suture the internal oblique fascia and its attached transversalis fascia to Cooper's ligament without undue tension.

Freeing the Sac.—The contents of the inguinal canal are grasped with forceps and lifted to a point just above the external ring. The cremaster muscle and the cremasteric fascia are incised and dissected from the sac and cord. Next, the layer of infundibuliform fascia, which covers the sac and cord, is incised, permitting the sac to be separated easily from the cord.

Ligation of the Sac.—When operating with local anesthesia it is a good plan to inject the neck of the sac before transfixing and ligating it. For a small hernia traction is applied on the sac, and a transfixing ligature of medium silk or cotton No. 30 is passed through the neck of the sac well within the internal ring. Before the ligature is tied the sac should be pulled down and held open for inspection to make sure that no portion of the omentum, intestine or bladder is caught in the ligature, which is then tied at a high level while traction is applied on the sac. If the neck of the sac is large, a purse-string suture is often more satisfactory than a simple ligature. If the sac is ligated high enough there will be a good "spring-back" of the stump, which will be drawn up inside the internal ring by the elasticity of the peritoneum.

Deep Sutures to Cooper's Ligament.—The most important step of the operation is the suturing of the transversalis fascia to Cooper's ligament. If the hernia is large, the aponeurosis of the internal oblique fascia is also sutured to the ligament. At no time is the red muscle of the internal oblique included in the sutures. If the red muscle is stitched, it quickly "cuts out" and paves the way for early recurrence of the hernia. The cord should be handled as little as possible. It should be retracted with an instrument that does not compress it rather than by the common practice of passing a strip of gauze beneath it, which may cause torsion of the cord when the latter is replaced in the internal ring next to the peritoneum. Traumatism of the cord is responsible for most of the after-pain as well as for the occurrence of epididymitis, orchitis, and, on rare occasions, thrombosis and embolism.

With the cord gently retracted to the inner

side, the first stitch is taken in the form of a purse-string suture of the fascia around the internal inguinal ring with heavy silk or cotton No. 30. A similar partial purse-string stitch in the transversalis fascia closes the internal ring around the spermatic cord. A heavy silk or cotton No. 20 suture on a round-pointed full-curved needle is passed through the transversalis fascia and the aponeurosis of the internal oblique. Next, the needle passes outward through the thickened Cooper ligament along the upper border of the pubic ramus. This stitch is usually taken about 2 inches (5 cm.) from the spine of the pubis, while the femoral vessels are protected by the surgeon's index finger on the crest of the pubic bone. The highest stitch is placed first and tied, usually 1 to 2 inches (2.5 to 5 cm.) laterally from the pubic spine. This procedure is to protect the femoral vessels. The two sutures closest to the pubic spine pass through the lacunar (Gimbernat's) ligament as well as Cooper's ligament. In all, four or five sutures are used, and they should be No. 5 heavy braided silk or No. 20 cotton. The knots of the tied sutures should be cut very close. If the femoral vein is difficult to locate or if there is a large Rosenmüller's gland, it is advisable not to attempt to carry the sutures more than half way between the pubic spine and the femoral vessels.

In order to make the opening as small as possible, all fat and other tissue should be dissected away from the cord and nothing allowed to remain but the vas deferens, the artery, the nerve and the veins. After the deep sutures are tied, a stitch is placed above the cord as recommended by Coley (W. B.), and passed through the upper part of the internal ring to narrow and strengthen the ring, thus lessening the danger of recurrence. The internal ring should be closed as snugly as possible around the cord, there being little danger of making it too tight. If there is any question on this point, however, pulsation in the spermatic artery may be tested by palpation.

Care must be exercised to avoid tying the sutures too tight and to guard against puncturing the deep epigastric and external iliac vessels.

Closing the Aponeurosis of the External Oblique.—The cord is replaced on its new floor, which is formed by the internal oblique and the conjoined tendon. The cut edges of the aponeurosis are freed from fatty connective tissue and sutured together from above downward by interrupted sutures of silk or cotton No. 40, leaving just enough room in the new external ring for the cord. The flaps of aponeurosis are overlapped from above downward in a double-breasted fashion to strengthen the aponeurotic covering of the new inguinal canal and to take the strain off the deep sutures.

Closing the Subcutaneous Tissues and the Cutaneous Incision.—The fat is brought together with interrupted sutures of fine silk or plain cotton No. 80, and the skin incision is closed by interrupted or mattress sutures of fine silk or plain cotton No. 80. When the cosmetic result is important, it is best to use a subcuticular suture.

Disadvantages of the Cooper's Ligament Operation.—Many surgeons maintain that the Cooper's ligament operation is more difficult than other operations for inguinal hernia, and they have cited the following objections: it is more difficult to expose Cooper's ligament, because of its location; there is more danger of injuring important blood vessels; there is danger of temporary edema of the leg on the side of the operation; Cooper's ligament is at times small and undeveloped and cannot be depended upon; it is often difficult to obtain adequate support for the inguinal ring, which makes it necessary to use additional supporting sutures after the fascia has been sewed to Cooper's ligament, and the operation takes more time than do other procedures.

SUMMARY

The author discusses the advantages and disadvantages of the Cooper ligament operation in the treatment of inguinal hernia. The operative technic is described in detail, with special attention to suturing requirements. It is emphasized that this operation preserves the normal unhampered action of the fascia and muscles of the inguinal region.

RIASSUNTO

L'A. discute i vantaggi e gli svantaggi dell'operazione del legamento di Cooper, opera-

zione che sta diventando sempre piu' popolare. La tecnica operativa viene descritta in dettaglio.

RÉSUMÉ

L'auteur discute les avantages et les désavantages de l'operation de Cooper, du ligament pour le traitement des hernies inguinales. La technique opératoire est décrite en détails avec l'attention spéciale sur les necessités de sutures. Cette opération, d'apres l'auteur préserve l'action normale du fascia et des muscles de la région inguinale.

RESUMEN

El autor discute las ventajas y desventajas del procedimiento operatorio del ligamento de Cooper en el tratamiento de la hernia inguinal. Se describe en detalle la técnica operatoria, con especial atencion en lo que atañe a la sutura. Se señala que esta operación preserva la acción correcta normal de la fascia y músculos de la región inguinal.

ZUSAMMENFASSUNG

Verfasser eroertert die Operation des Cooperschen Ligaments, ihre Vorzuege und Nachteile. Die Technik wird eingehend beschrieben, und auf die staendig wachsende Beliebtheit des Verfahrens wird hingewiesen.

REFERENCES

Anson, B. J., and McVay, C. B.: Anatomy of Region of Inguinal Hernia, Surg., Gynec. & Obst. **66**:186-191, 1938.

Babcock, W. W.: The Ideal in Herniorrhaphy; A New Method Efficient for Direct and Indirect Inguinal Hernia, Surg., Gynec. & Obst. **45**:534-540, 1927.

Coley, W. B., and Hoguet, J. P.: Operative Treatment of Hernia, Ann. Surg. **68**:255-268, 1918.

Harkins, H. N., and Swenson, S. A., Jr.: A Cooper's Ligament Herniotomy, S. Clin. North America **23**: 1279-1297, 1943.

Lotheissen, G.: Zur Radical Operation der Schenkelhernien, Zentralbl. f. Chir. **25**:548-550, 1898.

McVay, C. B., and Anson, B. J.: A Fundamental Error in Current Methods of Herniorrhaphy. Surg., Gynec. & Obst. **74**:746-750, 1942.

Narath, A.: Ueber eine eigenartige Form von Hernia cruralis (praevascularis) im Anschlusse an die unblutige Behandlung agneborener Hüftgelenksverrenkung, Arch. f. klin. Chir. **59**:396-424, 1899.

Watson, L. F.: Hernia, St. Louis: C. V. Mosby Co., 1948, 3rd ed.

Watson, L. F.: Lateral Displacement of Cord in Inguinal Hernia Operation, Surg., Gynec. & Obst. **40**: 119, 1925.

Announcement

INTERNATIONAL BOARD OF OCCUPATIONAL SURGERY

The Executive Council of the United States Chapter and the Board of Trustees of the International College of Surgeons have unanimously approved the formation of an International Board of Occupational Surgery, the aims of which are (*a*) elevation of standards for the practice of occupational surgery, (*b*) conservation of the health of the worker after occupational injury, (*c*) official recognition of this specialty, (*d*) stimulation of interest in this field by students and members of the profession, and (*e*) cooperation in the establishment of facilities for graduate education in occupational surgery by means of residencies in hospitals affiliated with medical schools, or their equivalents.

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For further details, address Dr. Arnold S. Jackson, Secretary, United States Chapter, International College of Surgeons, 1516 Lake Shore Drive, Chicago 10, Illinois.

Impacted Fractures of the Neck of the Femur

GEORGE J. GARCEAU, M.D., F.I.C.S., AND HARVEY W. SIGMOND, M.D., F.A.C.S.
INDIANAPOLIS

IMPACTED fractures of the anatomic neck of the femur are given little consideration by the authors of textbooks on fractures. All agree that if impaction is maintained union will occur. About half recommend nailing; the other half recommend no operative treatment. Because of the impaction, it is our opinion that the treatment demands specific consideration. Once disimpaction occurs, the advantages in treatment of this fracture are lost. The peril of disimpaction is very real. This catastrophe can occur with alarming ease during nailing with a three-flanged nail. Impaction is observed in less than 10 per cent of fractures of the anatomic neck of the femur.

The mechanism of fracture is most commonly that of falling with the body weight on the greater trochanter, thus impacting the fractured ends. A second mechanism is that of wide abduction and deep extension of the hip. Simple rotation of the femur may produce a fracture but cannot cause impaction. The impaction is usually on the superior aspect of the fracture line and frequently on the posterior surface.

Our discussion is based on a study of 50 patients with impacted fractures of the anatomic neck of the femur. The story is different from that of unimpacted fractures. There is frequently a history of weight bearing on the affected limb for a few steps or even for a few days. The diagnosis of sprained hip is frequently made. The patient is able to lift the extended leg in spite of pain. The limb can be actively rotated. No external rotation deformity is present, and there is no appreciable shortening.

Accurate diagnosis is made only by roentgen examination; therefore, pain about the hip following a fall or other injury demands roentgen study. Anteroposterior and lateral views are necessary for a complete diagnosis. The lateral view is taken through the perineum. The well hip is flexed out of the way. The lateral view will show rotation of the femoral head (if present) and the general alignment of the head with the neck of the femur. The two views will help to determine the depth of impaction. This information is required to determine the most advantageous treatment.

Since only certain impacted fractures are suitable for nonoperative treatment, the classification and description of these fractures is important. The criteria for classification are (*1*) the degree of impaction and (*2*) the relation of the femoral head to the femoral neck. Impaction up to ¾ inch (1.9 cm.) may be observed on the films. Impaction of less than ¼ inch (0.6 cm.) is not satisfactory for nonoperative treatment.

Pauwels' classification of abduction and adduction fractures is based on the angle formed by a line drawn through the anterior-superior iliac spine and another drawn through the fracture line. If the angle is 30 degrees or less the lesion is called a Pauwels I fracture. A Pauwels II fracture is one with an angle of 30 to 50 degrees, and an angle of 50 to 70 degrees indicates a Pauwels III type of fracture. In fractures of the Pauwels I type the stress is conducive to impaction.

According to our classification, these fractures are of three types:

Type I. Subcapital abducted fractures, soundly impacted and with good alignment of the femoral head to the femoral neck. These are usually of the Pauwels I type.

Type II. Cervical impacted fractures, with or without abduction, with good alignment. These may be Pauwels type II or III.

Type III. All other impacted fractures of the neck of the femur with malalignment.

The treatment selected in each case depends on the type of fracture. Many orthopedic surgeons prefer internal fixation for all fractures of the femoral neck. We do not unalterably oppose this practice, but in our opinion internal fixation is often unnecessary.

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When it is used, the instrument of fixation must absolutely minimize the danger of disimpaction. About eighteen years ago the senior author was distressed when he disimpacted such a fracture while inserting a flanged nail. This experience was repeated a few years ago. The nail was easily driven through the neck of the femur, but disimpaction occurred when it engaged the more compact bone of the femoral head. Later we used Cranberry wires in a few cases; the wires were drilled into the bone.

The greatest danger is careless handling of the patient, especially during anesthesia. Since 1937 we have used the sandbag pillow splint for Type I fractures, with gratifying results. Heavy traction is to be avoided, because impaction may be lost after relaxation of the muscle spasm. A winged plaster boot or bilateral boots joined by a crossbar may be used to prevent external rotation. Neutral or slight internal rotation must be maintained and adduction prevented. Considerable activity is allowed. A trapeze is placed over the bed. This allows the patient to raise himself for nursing care. A back rest is allowed at all

Fig. 1.—Roentgenograms of Mrs. F. S., aged 49. Type I fracture; ½ inch (1.2 cm.) impaction; severe rheumatoid arthritis. Treated without internal fixation with union and fair result

times. The patient is urged to take deep breathing exercises many times daily. Massage is given to the abdomen, groins, thighs and calves several times daily. Muscle-setting exercises for the affected limb are beneficial. Such a program will greatly diminish the incidence of complications. (This treatment

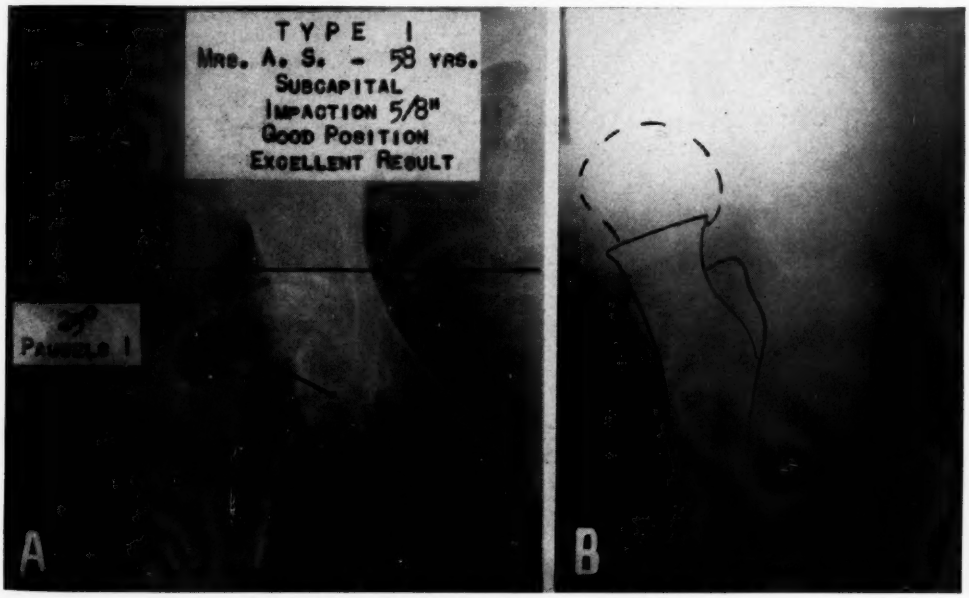

Fig. 2.—Roentgenograms of Mrs. A. S., aged 58. Type I fracture; ⅝ inch (1.6 cm.) impaction; good alignment of the fragments. Treated without internal fixation. Excellent result.

should not be called watchful expectancy.) Walking with support is allowed at six weeks or so.

Type II fractures are impacted with or without abduction (valgus). They are usually fractures of the Pauwels I or III type, which involves the neck rather than the subcapital portion of the femur. The shearing stress at the fracture is conducive to disimpaction, especially during the period of absorption at the fracture line. Internal fixation may be chosen for the treatment of this fracture. Reduction is not necessary, and impaction must be maintained; therefore, we prefer an internal fixation splint which requires drilling rather than pounding for its insertion. It is true that impaction will not always be lost, especially if the nail is inserted exactly in the center of the head, but perfect insertion of a flanged nail is difficult in an abduction fracture. Loss of impaction occurs frequently enough to warrant particular care.

Type III fractures may be deeply impacted. The alignment of the head to the neck of the femur is not acceptable. Therefore, disimpaction and reduction are required. The surgeon may use whatever type of internal fixation he prefers.

In our series there were 42 women and 8 men. The average age was 62 years, excluding one 33-year-old patient. Thirty-seven fractures were classified as Type I, 4 as Type II and 2 as Type III. Seven could not be classified because the films had been destroyed or lost. Only 1 of the Type I (valgus) fractures became disimpacted and required internal fixation. One Type II fracture became disimpacted when nailed. (There was another such case, the record of which cannot be found; this case was omitted from the series.) Thirty-five Type I, 2 Type II and 1 Type III fractures united without internal fixation. Five fractures were treated by internal fixation, with union.

Complications.—Two patients, 77 and 78 years old respectively, died of direct complications. One 33-year-old patient continued to have a painful hip and died of cirrhosis of the liver twenty-three months after injury.

Nonunion occurred in 1 hip.

In 2 hips avascular necrosis developed after union. One of these hips, with a fracture of Type I, healed without internal fixation. The other, with a fracture of Type II, became disimpacted on insertion of a Smith-Peterson nail and united; avascular necrosis developed later. This patient had a $\frac{5}{8}$ inch (2.8 cm) impaction. This group is too small to evaluate such complications as avascular necrosis and nonunion.

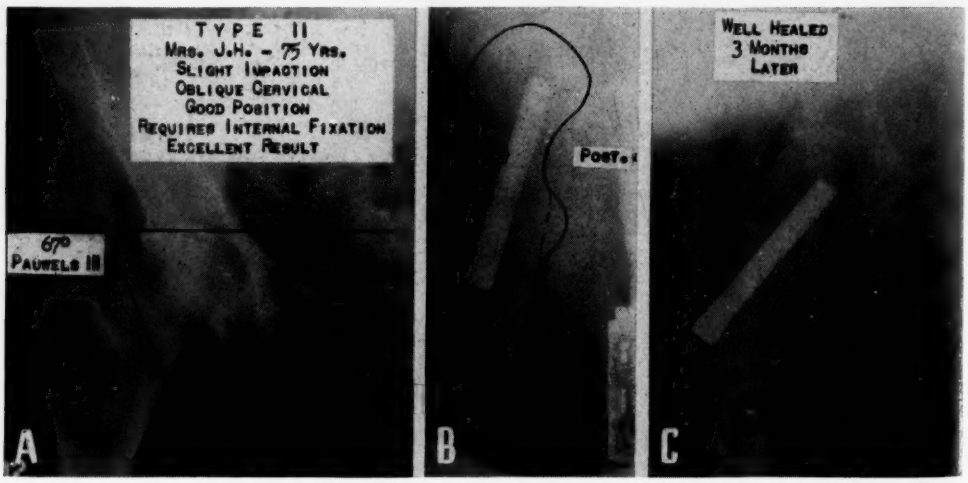

Fig. 3.—Roentgenograms of Mrs. J. H., aged 75. Type II fracture; impaction less than ¼ inch (0.6 cm,), but with good position. Treated without internal fixation. Excellent result.

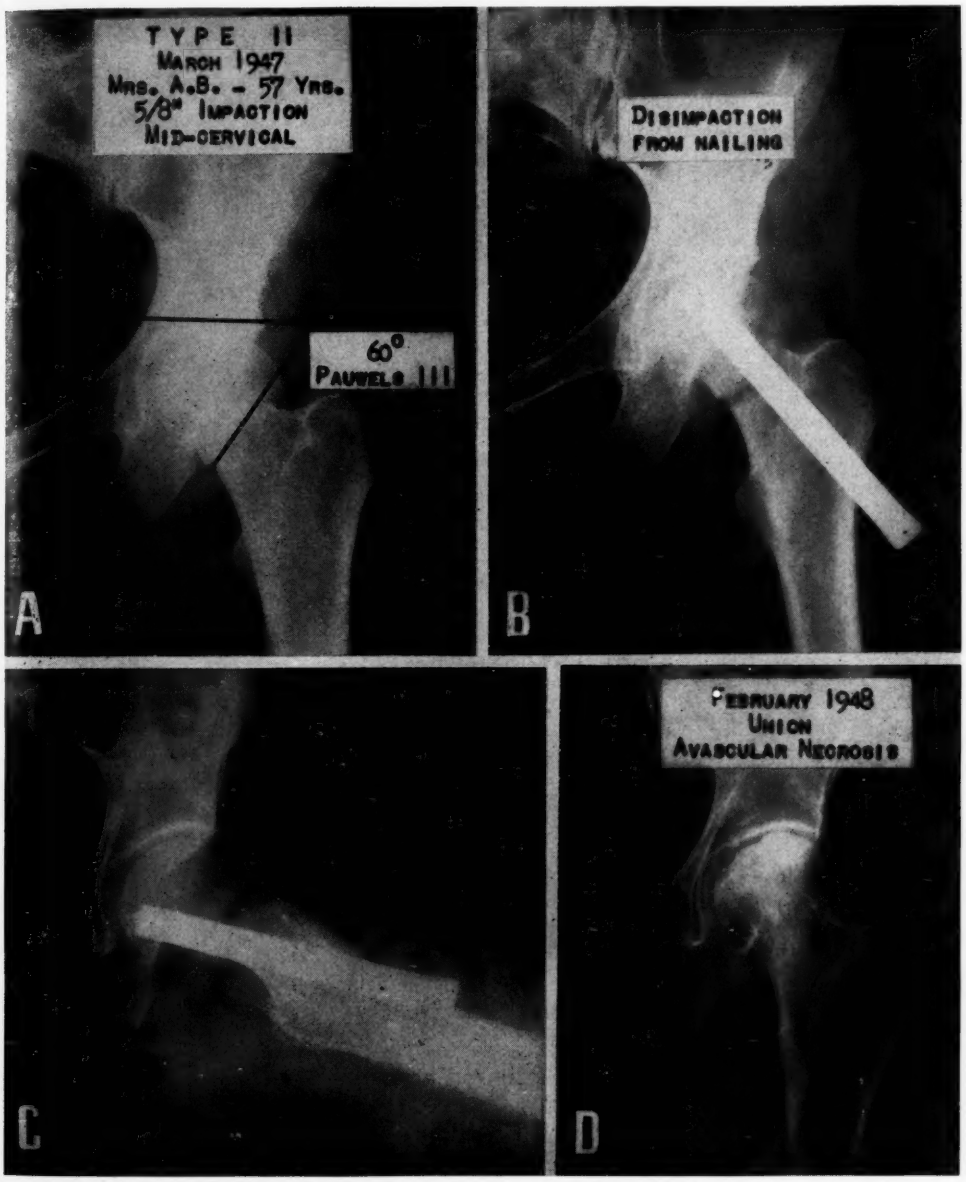

Fig. 4.—Roentgenograms of Mrs. A. B., aged 57. Type II fracture; 5/8 inch (1.6 cm.) impaction. Impaction was lost when a flanged nail was inserted. Avascular necrosis followed union of fracture.

The senior author was so convinced of the merit of nonoperative management that his own Type I fracture was treated without surgical intervention.

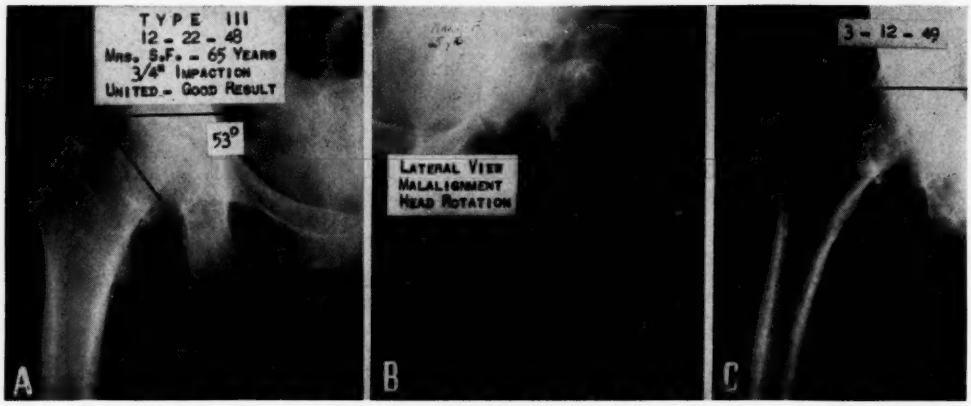

Fig. 5.—Roentgenograms of Mrs. S. F., aged 65. Type III fracture; ¾ inch (1.9 cm.) impaction. Alignment of head to neck not poor. Treated without internal fixation. Fracture united. Good result.

SUMMARY AND CONCLUSIONS

1. The well impacted subcapital abducted (valgus) fracture of the neck of the femur will do well under the most conservative non-operative management.

2. If internal fixation is used for fractures of Types I and II, the instrument should be one which is drilled into the bone.

3. If the fracture is of such a type that reduction is required, internal fixation is necessary.

4. A classification is suggested which may be useful in selecting the method of treatment.

RIASSUNTO

1. Frattura del collo femore subcapitalis ben serrato in abduzione fa bene sotto trattamente conservativo, non operativo.

2. Quando s'impiega la fissazione interna per fratture dei tipi I e II bisogna che l'istrumento sia qualunque che buca dentro l'osso.

3. Per la frattura d'un tipo che domanda riduzione, fissazione interna e necessario.

4. Suggerisce una classificazione vantaggiosa nella scelta del metodo di trattamento.

RÉSUMÉ

1. Une fracture subcapitale engrenée du col du femur avec abduction (valgus) peut être traitée avec succès sans opération.

2. Si la fixation interne est employée pour les fractures du type Numéro 1 et du type numéro 2, l'instrument doit être vissé dans l'os.

3. Si la fracture est de telle nature qu'une réduction est indiqué la fixation interne est nécessaire.

4. Une classification est suggérée qui peut être utile pour guider le choix de la méthode de traitement à employer.

ZUSAMMENFASSUNG UND SCHLUSSFOLGERUNGEN

1. Die fest eingekeilte subkapitale abduzierte (Valgus-) Fraktur des Oberschenkelhalses nimmt unter aeusserst konservativer nichtchirurgischer Behandlung einen guten Verlauf.

2. Wenn bei Bruechen vom Typus I und II interne Fixierung angewandt wird, so sollte ein Instument benuetzt werden, das in den Knochen hineingebohrt wird.

3. Falls es sich um einen Bruchtypus handelt, der Einrichtung erfordert, ist interne Fixierung notwendig.

4. Es wird eine Klassifizierung vorgeschlagen, die zur Auswahl der Behandlungsmethode von Nutzen sein mag.

RESUMEN

1. La fractura femoral cervical bien encajada subcapitalmente en abducción (valgus)

se beneficiará con la conducta no operatoria más conservadora.

2. Taladrar el hueso con el instrumento en caso de usarse fijación interna para fracturas de tipos I y II.

3. La fijación interna es necesaria si se trata de un tipo de fractura que requiera reducción.

4. Se sugiere una clasificación que puede ser útil para seleccionar el método de tratamiento.

REFERENCE

Pauwels, F.: Der Schenkelhalsbruch im Mechanisches Problem. Ztschr. f. Orthopod. Chir. Hassenbergsteige, Stuttgart, 1935 (Ferdinand Enke).

Echoes of the Past

VI: The Mythical History of Cesarean Section

Although the legendary history of cesarean section quite frequently appears in nonmedical literature, it is rarely mentioned in the writings of the older medical scribes. The treatises of the ancient masters in medicine, such as Hippocrates, Galen, Celsus and Aetius, contain nothing of it.

Pliny, the Latin writer, says that Scipio Africanus was the first and Manlius the second of the Romans who owed their lives to the operations now called cesarean section. The seventh book of Pliny states that Julius Caesar was born in this way, a legend which gave the procedure its name. Some deny the validity of this belief.

Ancient Roman sculpture depicts the birth of Bacchus (God of Mirth and Wine) by cesarean section from the corpse of Semele. Greek mythology unfolds the birth of Bacchus in the following way: After Zeus burnt the house of Semele, daughter of Cadmus, he sent Hermes in great haste with directions to take from the burned body of the mother the product of a seven-months pregnancy. This child was Bacchus. Aesculapius, according to the legend of the Romans, had been excised by his benefactor Apollo from the womb of his dead mother, Corinis, who was already on the funeral pile. For this reason all products of cesarean section were regarded as sacred to Apollo. Persons born in this way were thought to be endowed with sagacity and bravery.

Ancient records tell us that one of the kings of Navarre was delivered in this way, as was the celebrated Doge of Venice, Andreas Doria. Jane Seymour, one of the wives of King Henry VIII, was supposed to have been delivered of Edward VI by cesarean section. The king, after the results of a consultation of many physicians was made known, exclaimed: "Save the child by all means; I shall be able to get mothers enough!"

Robert II of Scotland was said to have been born in this way. He was born by a postmortem cesarean section. His mother, Margery Bruce, was killed while riding, having been thrown from her horse. In Macbeth, Shakespeare places the following words in the dialogue spoken by MacDuff, "Who was from his mother's womb untimely ripped," This is another reference to cesarean section. The philosophic literature of London circa 1900 relates the account of cesarean section performed by a butcher.

With the advent of modern surgery and antisepsis cesarean section became an accepted therapeutic procedure in certain obstetrical difficulties. Owing to improvements in technic advocated by Porro and others, cesarean section has become a frequent daily occurrence, with a minimum mortality in the hands of the trained obstetrician.—*Bernard J. Ficarra, M.D., F.I.C.S.*

Some Simple Thoracic Emergencies

THOMAS J. KINSELLA, M.D., F.A.C.S.
MINNEAPOLIS

A NUMBER of rather simple mechanical conditions arise within the thorax which deserve consideration. The average physician without special training in thoracic diseases does not think in terms of mechanical and physiologic variations within the chest; he usually regards it as a region where mysterious things beyond his knowledge occur at the most inopportune times. Four or five of the commoner conditions will be discussed here, in the hope of clarifying this situation. The discussion will include pneumothorax of various types, cyanosis of the newborn, pulmonary cysts, mediastinal and subcutaneous emphysema and atelectasis.

Pneumothorax.—Pneumothorax may occur or be used in a variety of situations which should be understood and recognized if they are to be treated intelligently. They are best considered in three categories: induced or therapeutic pneumothorax, traumatic pneumothorax and spontaneous pneumothorax. A tension pneumothorax is any pneumothorax in which pressure develops to a point where it embarrasses the patient. It may produce serious and dangerous, if not fatal, results if not recognized and relieved.

Induced Pneumothorax: Induced pneumothorax may be used either as a diagnostic or as a therapeutic measure. Therapeutically it is used most commonly in the treatment of active pulmonary tuberculosis, which is beyond the field of this paper. There are a few other situations, however, in which one may use it to advantage, such as the control of pulmonary hemorrhage from bronchiectasis or pulmonary tumor; occasionally, in such cases, it may be a life-saving procedure. As a temporary measure, it has been used in the treatment of pulmonary abscess but here may well prove hazardous and detrimental.

Diagnostically the establishment of a pneumothorax may be of value in several different ways:

1. To determine whether a tumor lies within the lung substance or in the chest wall or the mediastinum.

2. To determine the side from which bleeding arises in a bilateral lesion, either tuberculous or bronchiectatic.

3. To visualize a thin-walled cavity or a bleb in the lung.

4. To outline the diaphragm in the patient who has a mass in that region.

5. To improve bronchoscopic visualization of the upper lobe bronchus by collapsing and depressing the upper lobe. The introduction of right-angle and foroblique telescopes has practically eliminated the need of this procedure.

6. As a preliminary to thoracoscopic examination, to determine the presence of tumor on the surface of the pleura or the lung.

7. To replace aspirated fluid as a contrast medium for roentgen visualization of pathologic changes in the lung or on the pleura previously obscured by massive effusion.

The use of pneumothorax in several of these categories may save the patient an unnecessary operation. In like manner, a diagnostic pneumoperitoneum may aid in outlining tumors close to the diaphragm; in differentiating diaphragmatic hernial protrusions, and in proving or disproving the presence of subphrenic infection as a source of intrathoracic pathologic changes.

Traumatic Pneumothorax: Traumatic pneumothorax may be defined as a collapse of the lung, normal or abnormal, from air or gas in the pleural cavity resulting from or following some external or internal trauma of greater or less degree. For purposes of discussion, it is well to divide traumatic pneumothorax into true major traumatic pneumothorax and accidental pneumothorax. True major traumatic pneumothorax may result from:

1. A crushing chest injury, either major or minor. This includes simple, single and multi-

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ple rib fractures and traumatic rupture of the trachea or the esophagus.

2. Blast injuries from an explosion, from a compressed air hose or tire or even from a liquid under pressure.

3. Closed penetrating injuries of the chest, such as bullet wounds or stab wounds from a knife, an ice pick or a splinter of wood or glass.

4. Open penetrating wounds of the chest in which the chest wall is torn open, leaving an open sucking wound.

5. A perforating foreign body in the esophagus, such as a nail, a sliver of glass, a bone, etc.

Traumatic pneumothorax from any of these sources should not be difficult to recognize when there is a history of injury to the chest and may be diagnosed by physical examination or roentgen studies or both if one will only think of the possibility of such a condition. I am convinced that many patients die from unrecognized and unrelieved tension pneumothorax after trauma to the chest in automobile and other accidents who could be saved by a little thought and some very simple therapeutic measures. The recognition and prompt treatment of a pneumothorax, even if it is without great tension, may be extremely important to any seriously injured patient; indeed, it may save his life. If one thinks of the possibility of pneumothorax, one may easily recognize and treat it.

Accidental Pneumothorax: Accidental pneumothorax is a true type of traumatic pneumothorax. The trauma may be trivial; it is usually secondary to some diagnostic or therapeutic procedure and occurs as an accidental complication of that particular examination or treatment. It occurs commonly, far too commonly, but is recognized, or at least admitted, much less frequently. It is seen in the following conditions:

1. Following induced pneumothorax—probably at least 50 per cent of the time if one will search carefully for it. Some advocate attempting to induce pneumothorax in this way, but the reasoning is not altogether clear.

2. Following thoracentesis.

3. From pericardial aspiration.

4. From a pneumothorax refill.

5. From attempted needle biopsy of the lung or lung puncture for diagnostic purposes.

6. From intercostal, sympathetic or brachial plexus block for anesthetic or therapuetic reasons.

7. From needle aspiration of a pulmonary cyst or abcess.

8. Following a dorsal sympathectomy operation in at least 30 per cent of cases.

9. During the course of a thoracoplasty or an extrapleural pneumonolysis operation.

10. Following bronchoscopic and occasionally esophagoscopic procedures.

11. During a laparotomy for disease of the gallbladder or stomach when high incision is made, or during operations upon the kidney or the adrenal gland when the diaphragm and pleura are inadvertently penetrated.

The possibility of accidental pneumothorax must always be remembered in the case of any patient in whom dyspnea or chest tightness develops after any manipulation about the chest. A collapse of this type is frequently of small degree but may go on to a tension pneumothorax with its associated dangers.

Spontaneous Pneumothorax: A spontaneous pneumothorax is one which occurs without any external or internal trauma. The margin between this and traumatic pneumothorax may be extremely small. An attempt to differentiate some from a traumatic pneumothorax may be difficult or impossible, particularly in certain medicolegal situations in which the legal term "post hoc propter hoc" comes into the picture. In many instances the trauma or alleged trauma is minimal or almost nonexistent, and yet, because the collapse occurred "on the job", the resultant pneumothorax is adjudged traumatic and, therefore, compensable. Spontaneous pneumothorax occurs most commonly from the rupture of a peripheral emphysematous bleb into the pleural space, permitting leakage of air and collapse of the lung. The resultant pneumothorax may be slight or large (or even a tension pneumothorax); it may be recurrent or chronic and with or without an associated hemopneumothorax or hydropneumothorax. Secondary infection in the pleural cavity is usually rare, and empyema seldom results.

A true spontaneous pneumothorax may also result from the spontaneous rupture of a tuberculous cavity or an abscess of the lung

into the pleural space. This can produce a very serious situation, in which a tension pneumothorax is complicated by infection of the pleural space with tubercle bacilli and both aerobic and anaerobic secondary organisms. This is more difficult to treat and carries a much more serious prognosis than the ordinary spontaneous pneumothorax. Fortunately it is much rarer. Another variety of spontaneous pneumothorax of the most serious import is that associated with spontaneous rupture of the esophagus, which inundates the pleural cavity with food and gastric contents. This is a highly fatal condition. If it is recognized early and treated thoroughly and radically, however, some of the patients can be saved.

In the majority of cases spontaneous pneumothorax was formerly assumed to be related to pulmonary tuberculosis and treated accordingly. It is now known that only a very small percentage of spontaneous pneumothoraces, particularly those not associated with contamination of the pleural cavity, are in any way related to pulmonary tuberculosis. They are the result of the rupture of a peripheral emphysematous bleb, a condition seen very commonly in the lungs of otherwise healthy persons with no known disease of the lungs, as well as in others with asthma, bronchiectasis, and a variety of other pulmonary conditions. These blebs are as delicate as cobweb and may rupture from the very slightest trauma, such as a sneeze, a cough, a sudden movement, bending over to pick up some object or to lace the shoes, straining at stool, lifting some object of medium size, a hug, a slight blow on the chest, a slip or slight fall or some other relatively minor activity. The ruptured bleb leaks air; the lung collapses until a balance is brought about between the pressures in the pleural cavity and the pressures in the peripheral portion of the lung. Leakage then ceases, permitting the opening to seal by rapid growth of the pleural cells. If no further tear occurs, the trapped air will slowly absorb and the lung expand.

If the ruptured bleb is large there may be a defect which is too broad for the pleural cells to bridge; the opening remains patent and leakage continues indefinitely, or healing may be insecure, with recurrent rupture of the bleb producing a chronic spontaneous pneumothorax in which the lung either partially expands and then goes down again or remains collapsed for a long period. The rupture of a tuberculous cavity or a nontuberculous abscess into the pleural space, producing a pneumothorax, usually results in the prompt development of empyema, either tuberculous or with mixed infection present, and frequently in the development of putrid empyema. It is an extremely serious complication and demands radical measures promptly established if the patient is to be saved. Spontaneous rupture of the esophagus into the pleural cavity likewise constitutes an emergency of most drastic proportions, yet some of the patients may be saved by prompt recognition and prompt and radical surgical treatment.

Hemopneumothorax: Hemopneumothorax, that is, pneumothorax complicated by an accumulation of blood in the pleural cavity, may occur under the following circumstances, and hemothorax (bleeding into the pleural cavity without the presence of air) may occur in most of them:

1. Crushing injuries of the chest with or without fracture of ribs, tearing of the lung or rupture of one of the large vessels or heart chambers.

2. Penetrating injuries from stab wounds, bullet wounds or fragments of other material. Occasionally a hemothorax or hemopneumothorax follows a simple needle puncture of the chest wall. A simple rib fracture also may result in hemothorax or hemopneumothorax, particularly if fragments of the rib are driven inward by a fall against a projecting object. The bleeding may occur from an intercostal vessel, an internal mammary vessel, the azygos vein, one of the large vessels at the hilum or the parenchyma of the lung itself.

3. Spontaneous pneumothorax.

Any rapidly accumulating fluid formation within the chest following trauma must be considered as blood except in case of spontaneous perforation of the esophagus, when it is usually stomach contents. Rapidly accumulating blood within the pleural cavity calls for prompt transfusion and supportive measures and prompt surgical intervention to control the bleeding. If the bleeding occurs slowly, supportive measures are indicated with

the hope that bleeding will be self-limited. Early aspiration is not to be recommended except to relieve tension. The fluid should be removed from the pleural cavity after forty-eight to seventy-two hours in order to prevent clotted hemothorax and entrapment of the collapsed lung.

Tension Pneumothorax: Tension pneumothorax is any pneumothorax in which the pressures within the pleural cavity are built up to such a point as to affect the patient adversely. This does not always occur at the same degree of pressure. Symptoms may result from collapse of the lung with loss of breathing space, from displacement of the mediastinum or from excessive pressure brought to bear on the thin-walled veins at the base of the heart. The possibility of tension pneumothorax must always be borne in mind and a careful watch kept for the development of tension. Attention must also be called to the fact that any pneumothorax pocket may become a tension pocket from expansion of the air with increasing altitude in cross country or air travel. Excess pressure must be relieved promptly, but everyone concerned must realize that usually when the tension is relieved it tends to recur, and provision must be made for its subsequent relief either by repeated aspiration or by the connection of an indwelling cannula or catheter to a water breakover or a continuous suction apparatus. No elaborate apparatus is needed in an emergency to relieve a tension pneumothorax. An 18-gauge needle alone, without syringe or tubing attached, will permit air to escape and decompress a tension pocket temporarily until a more suitable arrangement can be provided. Persistent leakage may call for a thoracotomy and surgical repair of the leaking area.

Treatment.—Many pneumothoraces cause little trouble, produce no symptoms and may absorb and disappear spontaneously. If there seems to be no tendency for the pneumothorax pocket to refill, the air may be permitted to absorb, which it does slowly, for two to several weeks, depending upon the size of the pocket and the normality of the pleural surface. After the leaking point has become sealed, the expansion of the collapsed lung may be facilitated by aspiration of air from the pleural space. This is probably better carried out in several stages to avoid excessively high negative pressures which might reinduce leakage. Complete aspiration is not necessary, and great care must be exercised in attempting to remove the latter part of the pneumothorax pocket, because of the danger that the needle may puncture the lung, thereby inducing an additional accidental pneumothorax. Occassionally a single aspiration is all that is necessary in order to start absorption of air and bring about expansion of a lung which has remained down for some time.

The use of an "under water" breakover connected to an indwelling cannula or catheter is of value with tension pneumothorax and may prove a simple answer to the situation until the leakage ceases. The use of continuous suction with controlled pressures may be necessary if leakage persists, just enough suction volume being utilized to keep ahead of the leak and with avoidance of the creation of excessively high negative intrapleural pressures which may reinduce leakage. Open operation with excision of leaking blebs or suture of the lacerated lung may be necessary if the refilling of a pneumothorax is of dangerous proportions or if the lung does not tend to seal off and control the leakage spontaneously. It may be necessary, for chronic spontaneous pneumothorax when the lung has remained collapsed for a considerable time, not only to excise the leaking blebs but to decorticate the lung which has remained in collapsed position and become bound down by a deposit of fibrin on its surface.

Cyanosis and Dyspnea of the Newborn.—The presence of cyanosis and dyspnea in a newborn child presents a true emergency situation. It may be due to any of a variety of conditions listed as follows:

1. The presence of mucus or other secretions in the bronchial tree.
2. Improper expansion of the lung—"detelectasis".
3. Congenital deformities of the heart and great vessels.
4. Diaphragmatic hernia.
5. Pulmonary cysts or blebs.
6. Traumatic pneumothorax due either to birth trauma or to the efforts of the attending physicians and nurses to induce respiration.

7. Agenesis of the lung.
8. Empyema of the newborn.

When a newborn baby does not breathe well or cannot maintain its color, the first thought should be that the difficulty may be due to the presence of mucus or other secretions in the tracheobronchial tree; hence, the first effort should be to hold the child in an inverted position to favor gravity drainage of such secretions. This should be followed by catheter aspiration of the pharynx and the upper part of the respiratory tract and perhaps soon by aspiration of the lower part of the tract. The use of oxygen and the respirator is fine as a temporary measure, but it may be fatal to assume that mucus has been the sole cause of the difficulty. To spend a great deal of time attempting to aspirate the respiratory tract when the difficulty is due to something else may deprive the child of all possible chance of recovery. As soon as possible, even while the child is being given oxygen and artificial respiration, a roentgen film of the chest should be made, for detelectasis, some congenital deformities, diaphragmatic hernia, pulmonary cyst or blebs, traumatic pneumothorax, maldevelopment of the lung, empyema of the newborn and intrathoracic tumors may all be demonstrated by a single roentgenogram and the true nature of the difficulty easily determined.

It is particularly important in cases of diaphragmatic hernia to discover the condition at once, before the child is given any water or a feeding of any type. Many of these children do well until they begin to swallow air, which distends the trapped stomach and bowel, inducing tension within the chest, displacing the heart and mediastinum and compressing the contralateral lung until death ensues. Prompt recognition and early surgical intervention may save the child. The same applies to traumatic pneumothorax and empyema of the newborn, in both of which aspiration of air or pus promptly relieves the mechanical situation.

Another point which is usually overlooked with patients who require some artificial respiration and oxygen administration is the fact that to leave the lungs inflated with pure or nearly pure oxygen may invite a recurrence of respiratory difficulties very soon after its use is discontinued. The oxygen absorbs rapidly from the alveoli, which may then promptly return to an unexpanded condition, with recurrence of cyanosis. When the high oxygen mixture used in the respirator is discontinued, the child should be carried for a time on air, so that the lungs are well inflated with a mixture which is not absorbed as rapidly as oxygen and which may prevent their subsequent collapse.

Tension Cysts and Bullae of the Lung.— The scope of this paper does not permit a detailed consideration of pulmonary cysts, either congenital or acquired. The cysts with which one is concerned from the emergency standpoint are those which through a check-valve mechanism undergo progressive distention to a point at which the patient becomes embarrassed by the mass of the cyst or bleb itself. This may occur with either the congenital or the acquired bullous cysts but is particularly prone to occur in the latter, which are usually multiple and not infrequently bilateral. As the blebs increase in size they compress adjacent lung tissue, giving rise to increasing dyspnea, and at times produce a condition known as the vanishing lung. Needle aspiration of ballooning cysts is not to be recommended except as an emergency procedure immediately before surgical exploration, as this decompression of the cyst is not permanent. It tends to refill rapidly; the pleural cavity is usually not obliterated, and a needle puncture wound merely creates a leak between the cyst and the pleural cavity with secondary development of a tension pneumothorax. Catheter drainage with continous suction after fixation of the cyst wall to the chest wall is advocated by Head to bring about marked reduction in the size of the bullae and consequent reexpansion of adjacent lung tissues. It is as yet undetermined how lasting the results of this treatment may be or how soon the blebs tend to refill, with secondary ballooning. In certain selected situations ballooning is confined to a localized area of the lung with compression of adjacent lung tissue; under such circumstances, open thoracotomy with resection of the ballooning area may be followed by marked relief and rapid increase in vital capacity. It is almost never possible to excise all of the involved areas of the lung, so it is

logical to expect that in the long run additional ballooning will occur. Temporary relief, however, may be important, and some may improve for a considerable period.

Subcutaneous and Mediastinal Emphysema.—Subcutaneous emphysema from the patient's standpoint may be a very painful and alarming condition, but from the medical standpoint, aside from the pain produced, it is not particularly serious. Even when the degree of subcutaneous air infiltration is sufficient to obliterate the features and to extend over wide areas of the body, it does not seriously jeopardize the patient's life. Subcutaneous emphysema results from:

1. Traumatic injuries of the chest, both the crushing and the closed penetrating type.
2. Rib fractures, with or without an associated pneumothorax.
3. Tension pneumothorax, particularly one which has been aspirated.
4. Traumatic perforation of the esophagus.
5. Traumatic rupture of the bronchus.
6. Spontaneous rupture of the esophagus.

The seriousness of the lesion is directly related to the seriousness of its exciting cause, the emphysema being largely a painful and disturbing symptom. One must always be certain, of course, that the gas in the tissues is not from an anaerobic gas-forming infection, which, of course, is a much more serious condition. Treatment must be directed at the cause of the leakage in order to prevent continued loss of air into the tissues. This may involve continuous drainage of a tension pneumothorax pocket or surgical attack upon a ruptured esophagus or bronchus.

Mediastinal emphysema, on the other hand, may be an extremely serious condition and may result from any of the six conditions mentioned above. It becomes serious because of the pressure exterted by the gas under tension in the loose tissues of the mediastinum, compressing the thin-walled veins and even the trachea to a serious degree. Treatment must be directed at eliminating the source of the leakage if possible and, by surgical decompression of the mediastinum in the supersternal notch, permitting escape of the air and relief of the pressure upon the mediastinal structures. The migration of air through the loose areolar tissue may carry infection with it and produce serious mediastinitis.

Atelectasis.—Atelectasis from bronchial obstruction, more or less acute, is of such common occurrence that it must be considered and handled frequently. The more chronic types of pulmonary collapse due to bronchial stricture and bronchial tumor, both benign and malignant, are beyond the scope of this discussion. Atelectasis resulting from bronchial obstruction from mucous secretion occurs commonly in both medical and surgical practice. It is observed under the following circumstances:

1. In the postoperative period.
2. Following a chest injury.
3. Following pulmonary hemorrhage.
4. In the presence of bronchial asthma.
5. In any unconscious state—head injuries, diabetic coma, alcoholic intoxication, morphine or barbital poisoning, epilepsy and brain tumors.
6. Following aspiration of a foreign body.

The mucus producing the obstruction may originate in the lung but not infrequently is aspirated from the nose, the pharnyx or the stomach.

The clinical picture of atelectasis is rather easily recognized in the postoperative state, when one can almost wager that any sharp rise in pulse or temperature occurring within forty-eight to seventy-two hours after operation is the result of atelectasis rather than of pneumonia or a wound infection. If at the same time the patient manifests some dyspnea, there is probably little doubt about the nature of the situation. The incidence of this complication may be materially reduced postoperatively by frequent change of position and by requiring the patient to breathe deeply, to cough voluntarily, to take hot drinks or inhale steam if possible, and at the same time seeing to it that the patient's fluid balance is adequate and that, if oxygen is used, adequate humidification is supplied at the same time. The avoidance of the exeessive use of morphine, codeine and atropine will also reduce the incidence of such trouble. Postoperative bronchoscopic aspiration of secretions before the patient leaves the operating room is likewise important. Control of pain, permitting cough with less difficulty, will also prevent the development of this condition.

When atelectasis has developed, it may frequently be readily relieved by encouraging the patient to cough. If the operation has not involved the thorax the patient may be turned upon the uninvolved side and requested to take several deep breaths; then, with the chest held in full inspiration, heavy hammer percussion with the fist over the involved area may dislodge the mucus promptly and give almost immediate relief. The knee-chest position may also help the patient to cough and raise the offending mucus. The patient who does not wish to cough may be induced to do so by the inhalation of some irritating substance.

The use of intratracheal suction catheters may also be of great help. If relief cannot be obtained oherwise, bronchoscopic aspiration may be necessary. Very frequently in this situation, however, the bronchoscopist really does not aspirate the mucus obstruction, but merely provides the irritating factor which induces cough enough to dislodge the mucus. Stabilization of the chest wall in chest injuries and after thoracic operations may prevent the development of this situation or be an aid in its relief. The passage of nasal suction catheters through the nose to the trachea without any anesthesia may frequently accomplish the desired result in the unconscious patient. If results are not being obtained or if bronchoscopic procedures must be carried out at too frequent intervals, a tracheotomy should be done to permit frequent aspiration of the respiratory tree and may be life-saving. For shorter periods, an indwelling intratracheal tube may accomplish the same purpose. Atelectasis must be relieved or permanent damage to the lung may follow.

These situations are not mysterious. They may be recognized readily if one will but think of them and remember the mechanical forces involved. The majority may be treated early and effectively if one will but approach them on this simple basis.

SUMMARY

The author discusses and explains the various types of pneumothorax, cyanosis and dyspnea of the newborn, tension cysts and bullae of the lung, subcutaneous and mediastinal emphysema, and atelectasis, with suggestions for the management of each. He advocates awareness on the part of the clinicism of the mechanical forces involved, and expresses the opinion that this will lead to early, simple and effective treatment.

RÉSUMÉ

L'auteur discute et explique les différents types de pneumothorax; la cyanose et la dyspnée du nouveau-né. les kystes du poumon, l'emphysème sub-cutanné et mediatestinale, l'ateclatase et donne des suggestions pour le traitement de chacune de ces affections. Le clinicien doit être au courant des condïtions mécaniques engagées. L'auteur exprime l'opinion que l'étude des méthodes ordonne un traitement précoce, simple et effectif.

RIASSUNTO

L'A. discute e spiega i diversi tipi di pneumotorace; cianosi e dispnea del neonato; cisti a tensione, vesciche del polmone; enfisema sottocutaneo e mediastinale e atelettasia colla suggestione del dirigmento. Difende attento costantemente sulla parte del clinico alle forza meccaniche cagionate, indicando l'opinione che tale vigilanza condurrera' al trattamento precoce semplice ed effettivo.

ZUSAMMENFASSUNG

Verfasser eroertert und erklaert die verschiedenen Formen des Pneumothorax, die Zyanose und Kurzatmigkeit des Neugeborenen, Spannungszysten und Blasenbildungen in der Lunge, subkutanes und mediastinales Emphysem und Atelektase und macht Vorschlaege fuer die Behandlung dieser Erkrankungen. Er setzt sich dafuer ein, dass der Kliniker mit den in solchen Zustaenden wirksamen mechanischen Kraeften vertraut sein sollte und vertritt die Meinung, dass durch solche Kenntnisse eine fruehzeitige, einfache und wirksame Behandlung gewaehrleistet wird.

Thermal and Fluid Therapy of Atomic Bombing Injuries*

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TWO therapeutic measures for atomic bomb injuries, namely temperature control and the use of salt solution, have either been totally ignored in official and unofficial advices or have received such inadequate mention that their value is not generally understood. In covering this large deficit, space permits only illustrative examples from the literature, which can be verified as typical of a fuller bibliography. Also it should be made clear at the outset that the value mentioned is not theoretical but practical. In a crisis of widespread destruction, when speed of treatment is decisive in saving many lives, these measures can be effective when facilities for other treatments are lacking.

I. TEMPERATURE

Outside the central zone of total annihilation, any areas sufficiently populated to be worth bombing will have numerous refrigeration installations and some stocks of actual ice, often located underground. Cold water also can serve some purposes. There is the further possibility of bombing in winter weather. The practical means being available, one may consider the usefulness of reduced temperature for the three classes of atomic casualties, namely irradiation injury, mechanical trauma and thermal burns.

A. Irradiation Injury.—A single authoritative reference will suffice for including refrigeration as part of the routine care of radiation lesions. Knowlton and his associates[1] have stated concerning beta ray burns: "The initial treatment consisted of immobilization, elevation and cooling of the involved hands with ice packs." Also, "Local treatment consisted of routine burn therapy with accessory chilling and later surgical debridement and skin grafting."

B. Mechanical Trauma.—Concussion, falling walls and flying debris will cause every conceivable kind of traumatic injury. Cold is unique in inhibiting simultaneously pain, exudation, thrombosis, shock, infection, toxic absorption and tissue devitalization.

Hemorrhage: A wound of a large blood vessel will often require a tourniquet. Even if it is released at frequent intervals according to current first aid instructions, cold will still reduce tissue damage, but more important is the saving of both blood and tissue by leaving the tourniquet undisturbed, in accordance with both experimental and clinical proofs of preservation of bloodless refrigerated limbs for hours or days.[2] Rarely, if an abdominal tourniquet should be the only means of checking hemorrhage from great vessels anywhere below it, animal experiments indicate that the procedure may be feasible with refrigeration.[3]

Crush Injuries: These provide a typical field for the aforementioned benefits of cold, which was established as part of the routine treatment in England during the Second World War.

Amputations: Since refrigeration is the only anesthesia that abolishes not only pain but shock, it has been commonly employed for poor risk operations on debilitated patients. In ordinary practice most surgeons still follow the questionable rule that if a patient can stand shock without dying he may properly be subjected to it; therefore other kinds of anesthesia are chosen to suit the convenience of the surgeon and his staff. In an atomic bombing many of the patients will be so weakened by other injuries that any necessary amputation will be critical. Therefore the shockless refrigeration method will be especially important.

Brief Postponement of Operation: If a tourniquet has been placed on a limb, either for hemorrhage or in preparation for operation, the time limit of safety at ice temperature is

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considerable, as has been mentioned. Refrigeration without a tourniquet is illustrated by McElvenny's well known case[4] of amputation of both legs by a railway train. The pain, which resisted opiates, was controlled by packing the stumps in ice. The profound shock was treated, so that the amputations could be surgically completed fifty-eight hours later, the tissues then being as firm and odorless as at the beginning. There are other similar reports.[5]

Longer Postponement of Operation: Simple refrigeration without a tourniquet can check gangrene and toxic absorption until operative conditions are propitious. Classic illustrations are Mock's cases[6] of crushed pelvis with thrombosis of the iliac or femoral arteries, presenting a dilemma of immediate amputation and death from shock, or death from gangrene without operation. The legs were packed in ice for two or two and a half weeks, allowing time for treatment of other injuries and recovery of strength before the final successful amputation. The most prolonged preservation of this kind was recorded by Ottaway and Foote,[7] in the case of a seaman on a destroyer whose femoral artery and vein were severed 6 cm. below Poupart's ligament by a shell fragment. By refrigeration of the leg in an improvised air chamber at 2 C. the patient was kept well and comfortable for a month, until he could be transferred for amputation and final recovery. It is noteworthy that these various delayed amputations could be performed slightly above the knee, instead of at the higher levels which are the rule in immediate amputations. This is evidence of the development of collateral circulation in the refrigerated limbs, not prevented by vasoconstriction or tissue damage as some writers have feared.

Infection or Intoxication: Since our first experience with infected arteriosclerotic gangrene, most surgeons have become familiar with the quick control of fever and intoxication by packing the limb in ice. After an atomic explosion, treatment may be needed for secondary infection of neglected wounds or for dangerous primary infections, including gas gangrene.[8] Besides the ordinary inhibition of bacterial growth and activity by cold, the higher oxygenation signalized by the bright color of tissues and exudates must be inimical to anaerobic organisms. The fear of oxygen starvation of tissues because of inadequate dissociation of oxyhemoglobin at low temperature is unfounded, because the increased solubility of oxygen in plasma may alone suffice for the small need.[9] If a limb must definitely be sacrificed, a tourniquet with ice can be equivalent to an amputation, until surgical intervention becomes feasible.

Thrombosis and Embolism: One group consists of incomplete occlusions, or occlusion of small arteries in distal parts, typified by Bowers' cases[10] of threatened gangrene from fractures below the knee in military training. In these cases a partial blood supply persists, which is inadequate for immediate maintenance of tissue life but may be reinforced by collateral circulation if time can be allowed for its development. Here radical refrigeration reduces tissue needs to a minimum for one to several days, after which the temperature is gradually raised according to tissue color and other indications.

A second group is typified by complete occlusion of a main artery in the thigh. In old cases, in which amputation is necessary but is temporarily prevented by refusal, shock, or cardiac or general weakness, gangrene and intoxication have been held in abeyance for as long as three weeks by continuous ice packs. Theoretically, the ideal use of refrigeration is in early cases, "to extend the time limits and improve the results of embolectomy." Cold reduces the pain and shock of embolism, but its preeminent service is to preserve tissue vitality and check further thrombosis by retarding the enzymic process of clotting, preserving the smooth endothelial lining of vessels and preventing adhesion of thrombi. Though anticoagulant drugs are properly used at the same time, they act only against thrombosis and lack the power of cold to check degeneration of tissues. The embolus or thrombus acts as a partial tourniquet and thus facilitates the desired deep chilling; therefore simple ice packs may suffice. But the theoretical reasons for adding a tight tourniquet proximal to the point of occlusion are as follows: Such a tourniquet sets an absolute bar to upward propagation of the thrombus. It also stops collateral circulation, which is inadequate to preserve the

tissues and merely carries in harmful warmth and blood for further clotting. With the tourniquet deep chilling is more rapid and thorough, and the limb is anesthetized and ready for operation. By early use of this method, before degenerative changes have occurred, the time limit for successful embolectomy may be measured in days rather than hours. Also the chance of thromboses in more distal arteries is diminished, partly by the better preservation of tissues before embolectomy and partly by continuance of moderate cooling for a day or two afterward.

Reconstructive, Plastic and Orthopedic Operations.—The basic principle is that the preservative effect of cold may enable the saving of parts which would otherwise be lost. The simplest examples are cases in which fingers have been accidentally amputated to the extent that they are left hanging only by a shred of skin.[11] The reduction of local metabolism at ice temperature is such that the trivial supply of oxygen and nutrition through the small skin bridge suffices to keep tissues alive for several days. The severed parts, when sutured, become adherent even at the near-freezing temperature, so that it is possible after three or four days to begin gradually raising the temperature, until it is restored to normal within a week.

There has been no clinical imitation of the experiment of Blakemore and associates,[12] in which a dog's amputated leg was kept twenty-four hours in an ice box and then sutured back in place. Of greater immediate promise are cases in which the principal limb vessels are destroyed but tissue bridges remain. There is reasonable and practical hope that such bridges may supply the miminal nutritive needs of the refrigerated distal parts for a number of hours or days, until there is opportunity to restore circulation by modern vascular surgical procedures.

Reconstructive operations were most dramatically illustrated by Nachlas,[13] when hands shredded by blast injuries were not promptly amputated but instead were packed in ice for two or two and a half weeks while shock and abdominal injuries were treated. The mangled tissues then appeared as fresh as on the day of the accident, and it proved possible to repair fractures and lacerations so as to restore practically normal hand function. Nachlas emphasized the saving from "the horrors of no prehensile limb."

The cold storage of tissue grafts is familiar and is outside the present subject, except for passing reference to the preservation at temperatures as low as that of solid carbon dioxide, which would quickly destroy these same tissues in their natural location in the body.[14] Also Mock[15] demonstrated that simple chilling with ice or an ice bag for a couple of hours furnishes sufficient superficial anesthesia for removal of skin grafts. Only a few operators have adopted the rational plan of moderate cooling of operated areas for a day or two when the viability of poorly nourished structures may need support.

Mention has previously been made of the value of refrigeration anesthesia for orthopedic operations, with or without a tourniquet.[28] More moderate cooling may be continued postoperatively to control pain and swelling. The largest series of such cases was reported by Schaubel,[16] who showed also that cooling is feasible through casts.

The numerous and varied examples of the saving of tissues from necrosis have not only practical but also theoretical importance, as the most decisive disproof of loose allegations that tissues are gravely injured by refrigeration.

Miscellaneous Uses: Frostbite and immersion foot have connections with the present discussion only if atomic bombing should occur in winter, so that many well or wounded persons might suffer from exposure. The value of treatment by moderate reduction of local temperature has been demonstrated clinically[17] and experimentally.[18] The method does not differ greatly from the treatment of burns, but the moderate cooling must often be continued for a month or longer. Another use which can be required only fortuitously is the checking of toxic absorption from the skin or any peripheral parts. Examples mentioned elsewhere have been the retarded absorption of injected penicillin, etc., and the control of pain and toxic absorption in venomous bites and stings. More directly connected with war is Yudin's demonstration[19] that when lethal quantities of mustard gas are applied to the skin of rab-

bits, local refrigeration can inhibit absorption to such an extent as to save the lives of the animals.

C. Thermal Burns.—Burns are an important class of injuries even in peace; in mechanized warfare they are calculated to furnish a particularly high percentage of total casualties in atomic bombing. They can occur directly as flash burns from the far-spreading heat of the explosion, or secondarily from burning clothing or buildings. They preeminently require the unique specific properties of cold, namely, the simultaneous control of pain, shock, infection and tissue devitalization.

Details of the treatment must be adjusted according to the area and depth of the burn, but a more general division can be made between fresh and old burns. A fresh burn should be refrigerated as instantly and radically as possible, preferably with crushed ice applied over thin gauze, but cold water can serve if nothing better is obtainable. The first experience will show that pain is thus abolished more quickly and thoroughly than with any of the usual dressings or drugs. Further experience will prove that the subsequent course is remarkably mitigated as regards inflammatory reaction, shock, infection and necrosis. The duration of radical refrigeration varies with the severity, from perhaps an hour for a first degree burn to a day or two for the deepest burns. The skin temperature is then gradually raised, following the rule that it should be kept as high as feasible but as low as necessary. Healing is obviously faster with the more active metabolism at normal temperature, but any return of either pain or fever is a signal for further cooling. Therefore severe cases may require more or less subnormal surface temperatures for days or weeks.

The simplicity and efficiency of the method commend it under all conditions, but especially in the exigencies of a catastrophe. Without any cleansing, scrubbing, antisepsis or debridement, a single layer of gauze is applied and covered with ice, or as an emergency substitute the undressed area may be merely kept in cold water. First aid instructions should teach the general public to do these things for themselves, and in peace time similar instructions should be posted in factories where burns are frequent, because the quickest treatment is best both for comfort and for later results. Dirt comes away automatically with the daily changes of dressings, which are painless. Infection is suppressed by the low temperature so that meticulous asepsis is unnecessary. The benefits of sleep and food are obtained without the disturbance of either pain or narcotic drugs. Avoidance of the injury of mechanical or chemical cleansing, together with the maximal preservation of damaged tissues, results in less necrosis and less need of skin grafting than with any other treatment.

If the patient arrives for treatment not with a fresh burn but after delay of one to several days, various degrees of shock and infection are associated. These respond as mentioned under those topics. The local refrigeration is as radical as possible, until after one to several days the symptoms permit gradual raising of the temperature.

All burns are superficial enough to be amenable to surface cooling, so that this treatment can be used not only for the limbs but for all regions of the body. The size of the burned area imposes some limitations upon the degree of cold, because of the problem of maintaining body temperature if a very large area is radically chilled. The following details of technic may be noted: 1. For nearly all the conditions mentioned heretofore ice bags are satisfactory, the degree of cooling being regulated by the thickness of the covering or its absence. The only disadvantages are the labor of changing them and the fluctuations of temperature unless this is closely watched. In emergencies burns can be thus treated with ice, ice bags or cold water, as stated, but results are much better with special apparatus, such as Therm-O-Rite electrical refrigeration. The reasons are the frequently long duration of treatment, the nursing work, the weight of ice bags and the difficulty of keeping them properly placed, all of which are obviated by the light-weight applicators kept automatically at a selected temperature. 2. For extensive body burns, the continuous bath at a mild temperature[20] has been used more in Europe than in this country, and may be most useful for relieving pressure and regulating body temperature. 3. Cold

air can be adapted to the treatment of either localized or extensive burns.

Illustrative Observations: 1. There is experimental evidence of the benefit of reduced temperature for preserving both local tissues and life.[18] 2. Clinical experiences are confirmatory.[21] 3. Most impressive are (*a*) a case of recovery from a dangerously infected burn of a leg after eleven weeks of hypothermic treatment,[22] and (*b*) recovery from a burn of more than 50 per cent of the body surface with treatment in a refrigerated room.[23] Obviously, refrigeration can be combined with other treatments, as desired.

All these and other available facts justify criticism[24] of the common omission of any mention of hypothermia in review articles, such as that of Freeman[25] on arterial injuries and that of Evans[26] on thermal burns from atomic explosions.

II. SALT SOLUTION

Salt solution will be discussed with reference to two principal uses, namely, for shock and for hemorrhage.

A. Shock.—Shock must result frequently from the mechanical, thermal and other injuries of atomic bombing. Rational therapy must be directed to the etiologic factors. After the long controversy between upholders of the chemical (toxic) and physical (fluid shift) theories, I was the first[27] to recognize the fact that both these processes are concerned in shock, their relative proportions accounting for differences in the clinical picture and course. The discussion of treatment must overlap the preceding topic, since it includes adjustment of temperature as well as fluid. Before and during the Second World War three innovations were introduced in the treatment, namely: (*a*) temperature reduction (Allen[28]; Fay[29]); (*b*) local compression of the injured region (Patey and Robertson[30] in England), and (*c*) administration of salt solution (Allen[27]).

(*a*) Reduction of temperature was a direct reversal of the prevailing practice of warming for shock. Owing to the anachronistic instructions of the official Committee,[31] this harmful use of warmth was continued in the American armies during the war, with a few individual exceptions.

This lowering of temperature is the only known means of combating the toxic factor in shock. It diminishes the formation and absorption of tissue toxins, and also, by reducing metabolism, it reduces oxygen consumption and the consequent anoxia. These effects are evident in the practically complete prevention of shock by radical local refrigeration. Though the curative effect, after injury has occurred, is by no means equal to the prophylactic effect, its value has been fully confirmed[32] and is no longer disputed. Nevertheless there is little practical utilization of this knowledge, and the weight of tradition and authority still extensively perpetuates the harmful use of warmth.

(*b*) When the conditions are suitable, the repression of local exudation by compressive dressings may be beneficial or even life-saving. This English proposal has been confirmed by American investigators and has come into general clinical use. Nevertheless it is an equally unquestioned physiologic fact that pressure injures tissues, all the more dangerously if they are already partially anemic or devitalized. Also the warmth of such dressings, especially in the presence of exudation and low tissue vitality, serves to incubate bacteria, not all of which are controllable by antibiotics. Various degrees of temperature reduction, according to individual indications, reinforce the benefits of compression and help further by checking pain, infection and tissue devitalization.

(*c*) Saline replacement of lost fluid dates back to O'Shaughnessy's treatment of Asiatic cholera in 1831, a disease which typically causes shock through desiccation. The benefits of salt solution were increasingly appreciated by surgeons, and the value in burns was illustrated by Davidson[33] and Underhill.[34] But the international Shock Committee in the First World War turned progress backward by an unfounded misapplication of Starling's studies of the binding of water by plasma proteins. The official and academic authority of this Committee established the doctrine that "crystalloids" (a term jumbling together salts and sugars) are not only useless because their solutions pass quickly out of the circulation, but are actually harmful because the escaping fluid carries some of the precious proteins out of the blood stream. My contradiction of this

doctrine (1939-1941) may be claimed as a turning point according to the easily verifiable fact that up to that time every scientific writer and every textbook, without exception, repeated this dogma of the specific virtue of colloids and the uselessness and harmfulness of salt solution for shock, and since that time not a single investigator has made such a claim. The official Surgery and Shock Committees in the Second World War were anachronistic in this matter, just as in the matter of temperature, and there can be no estimation of the many lives lost by the instruction to use plasma alone and avoid saline solution for shock.[31] Several investigators have attempted a partial salvage of the old dogma by claiming greater benefits with plasma or various colloid solutions than with salt solution in cases of experimental shock. But the Mylon-Winternitz group[35] showed that dialyzed plasma and other colloid solutions are entirely valueless in the presence of shock. Rosenthal[36] confirmed the equal values of serum and saline, and added the observation that the two have equal effect whether given by vein or by stomach. These experiments were limited to mice and could not be conclusive clinically, owing to the important differences which I have pointed out elsewhere[37] between small rodents and man. But others found ample corroboration by others[38] in larger animals, and Fox[39] confirmed in burned patients both the benefit of salt solution and the feasibility of giving it in large measure orally. The same authoritative group who had prohibited the use of salt solution during the war reversed their position after the German surrender, by recommending predominantly large volumes of salt solution for burn shock.[40] The lingering attempt to ascribe special virtue to a small addition of plasma in this treatment is negated by the proofs of the identical effects of plasma and saline,[38] strictly confirming my results.

My ranking of salt solution actually above plasma can be readily substantiated in an atomic emergency. Besides the experimental fact of greater restorative value in terminal stages in shocked dogs,[27b] there are the practical advantages of immediate and unlimited availability and the usefulness orally as well as intravenously. Furthermore, severe shock especially from burns, demands fluid and sodium in large amounts speedily as much as 15 per cent of the body weight in the first twenty-four hours.[39] Salt solution has superiority in the very property which once caused it to be rejected—namely, the ease with which any surplus passes from the blood stream into the tissues. There is thus the quickest supply of sodium needed by the damaged tissues. This need was missed by the former authorities who thought only of circulatory volume. In addition, there is relative safety from the plethora which would certainly be fatal if any such huge amounts of plasma were infused rapidly, and this safety factor is particularly important under emergency conditions such as an atomic disaster, when accurate estimations of plasma volume or fluid need are not feasible. Danger from ordinary saline infusions, as described by Coller,[41] is a rare manifestation of a special abnormality. The storage capacity of the normal organism is huge. According to experiments on cats, Cutting[42] estimated the human tolerance limit at 35 liters infused intravenously at 350 cc. per minute. My experiments showed that the capacity is not diminished in traumatic shock; hence the much smaller volumes which are used therapeutically can be given rapidly and fearlessly, except in the presence of obvious cardiovascular or other complications.

This is not the place to evaluate the merits of different sodium solutions, either of special salts such as the lactate, succinate or bicarbonate, or the addition of other ions, or a subisotonic dilution to avoid excessive sodium accumulation. It is desirable that the ideal composition should be ascertained and be made as freely available as possible. But, granting that the lactate is more palatable for drinking, the general efficacy of plain physiologic saline solution should be recognized. It can save fully as many shocked animals as Ringer's solution, and any greater saving by any of the special compounds is slight or questionable. Still greater leeway can be shown in experiments. If one investigator will crudely estimate a flat teaspoonful of table salt to a pint of tap water, filtered but not sterilized, while his companion uses a solution meticulously prepared chemically and bacteriologically, their results in shocked animals will be practically indistinguishable. This lesson can be applied

clinically if conditions demand. The pre-eminent fact for physicians to grasp is that the specific need in shock is for water and sodium salts, not for proteins or any other colloids; and the harmfulness of delay is such that the quick, abundant administration of the simple fluid available in an emergency can save many lives which would be lost by waiting for blood, plasma or any ideal solution.

B. Hemorrhage.—The subject of hemorrhage overlaps that of shock, because the same injury often causes both; the hypotension of uncomplicated hemorrhage may induce hemorrhagic shock, and the oozing of plasma after burns and some other injuries may have a hemodynamic effect somewhat like that of hemorrhage. Three preliminary points should be clarified.

1. Simple loss of plasma protein is never a cause of death or danger in shock. Shock is an acute process, limited to a number of hours or a day or two, and the body has ample reserves to cover any losses due to burns or other injuries with this time. This is one reason why the simple provision of water and sodium suffices in shock. Any later needs pertain not to shock but to convalescence, and even then it will be uncommon to have hypoproteinemia without anemia. Thus whole blood is needed rather than plasma. Furthermore, it is recognized that treatment of persistent hypoproteinemia with plasma infusions is futile, because the quantities of protein which can be thus supplied in practice are too trivial. Therefore the traditional bugaboo of hypoproteinemia in the acute crisis of shock and also the notion of a nutritive demand for plasma should be dismissed.

2. The idea that plasma or other colloid solutions must remain in the blood vessels is fallacious. The abnormal increase of capillary permeability in injured areas results in leakage of any kind of fluid. This exudation is somewhat faster and greater with salt solution than with plasma. But anybody performing tourniquet shock experiments on animals can readily observe the great swelling of the legs which occurs also with plasma infusions, and which increases with every increase of the infusion. Therefore when local effusion is a serious danger, as in cases of intrathoracic or intracranial injuries, salt solution is more dangerous than plasma but plasma cannot be given with impunity, and exudation will be least if no kind of fluid is administered. In another eventuality, namely, persistent bleeding, there is the possibility of clotting of plasma while saline may cause dilution which conduces to hemorrhage. But if the saline is given cautiously, so that practically all of it passes into the injured tissues to supply their need for water and sodium, there will be less circulatory plethora than from an equal volume of plasma, hence less aggravation of hemorrhage by increased blood pressure.

3. Mention was made previously of refrigeration for preserving limbs on which a tourniquet has been placed for stopping hemorrhage. There has been no previous suggestion of another possibility—that under some conditions of critical hemorrhage Esmarch bandages with refrigeration may be used to press the blood out of all four limbs to make it available to the head and trunk. The fatal shock produced in animals by tourniquets placed on only one or two legs for a few hours illustrates the dangers of this method, especially in patients already weakened by hemorrhage, unless refrigeration is used to prevent shock.

Disposal of these preliminary topics leads up to the central fact that only transfusion of whole blood can completely supply the two needs created by blood loss, namely: (*a*) red corpuscles to transport oxygen, and (*b*) maintenance of hemodynamic and general nutritive functions. Only the latter can be provided by plasma or other substitutes. Omitting detailed references to the literature, an attempt may be made to clarify briefly the widespread confusion on this subject.

An equilibrium is known to exist between the extracellular fluid inside and that outside the blood vessels. It is modified but not abolished by the qualitative or quantitative changes connected with blood diseases, or by alterations of vascular permeability. Ordinarily, hypoproteinemia from loss of plasma is rather rapidly compensated by inflow from the extravascular reservoirs, but chronic hypoproteinemia signifies a deficit also of protein reserves; this cannot be overcome by any practicable amount of plasma infusions, because they mostly pass out of the circulation to preserve the mentioned equilibrium.[43]

Nevertheless, plasma is the only material that can maintain qualitatively normal composition of fluids inside and outside the vessels.

The first plasma substitute, salt solution, has been condemned for its property of passing rapidly out of the blood vessels. This allegation, derived from old-time experiments of Pilcher and Sollman[44] with injections of limited amounts of saline solution in rabbits, would make this solution useless for shock and still more so for hemorrhage. But what happens if the solution which escapes from the vessels is replaced by still more of the same? This question was first raised in my experiments (1939-1941), which showed that sufficiently large infusions of simple saline readily maintained blood volume in both shock and hemorrhage. In other words, the capillary permeability, either when normal in hemorrhage or when abnormally increased in shock, is not unlimited, and fluid does not continue to pour out indefinitely. The reason was explained by Warren, Merrill and Stead,[44] who demonstrated the equilibrium between intravascular and extravascular fluid, in such manner that when salt solution has built up sufficient tissue turgor it proceeds to remain in the circulation. Thus all the writers who have demonstrated the equal value of plasma and saline in shock have had no difficulty in overcoming oligemia and maintaining blood volume, even in the presence of hypoproteinemia with its deficiency of water-binding by proteins. This process entails tissue edema in proportion to the hypoproteinemia. But, though such edema must be viewed as detrimental, it does not reach a dangerous degree in the brain, in the lungs or elsewhere, as can be proved in dogs bled from the carotid to exsanguination. Only artificial plasmapharesis can unbalance the equilibrium sufficiently to make circulation impossible. The special dangers involved with intrathoracic or intracranial wounds or with cardiorenal-vascular disease are understood. Therefore any scanty supplies of plasma should be reserved for such cases. Otherwise emergency practice should take account of the fact that adequate circulatory volume can be maintained even after the most profuse hemorrhage by ample or repeated infusions of physiologic salt solution.

Much labor has been devoted to finding so-called "plasma substitutes," in which other colloids serve in lieu of plasma proteins to obviate the large volume and the edematous effect of saline infusions. Beginning with gum arabic, the search has proceeded with gelatin and other proteins, pecten, polyvinyl alcohol, etc., to the recent dextran, with attention not only to the water-binding properties but (lately) to molecular configuration resembling that of protein. For shock, all these substances have shown benefit corresponding to the saline solution in which they are administered, and none of them has been proved useful without salt. Likewise, for hemorrhage, they have never been proved able to save any animal that could not be saved by simple saline. Furthermore, all these investigators have disregarded the law of equilibrium. None of these foreign colloids can remain limited to the blood stream. They all pass into the extravascular fluids and also are stored by tissue cells, with characteristically high concentrations in the liver. Harmful effects have been demonstrated from all of them after they have been tried thoroughly enough. In the choice of a plasma substitute, therefore, the inquiry must be whether it is preferable to have the tissues loaded with surplus water and salt or with a foreign colloid. It seems evident that the excess of salt solution is safer and also can be eliminated more rapidly, in contrast to the long retention of the colloids. Since every colloid other than the native proteins is abnormal as a constituent of both fluids and cells, the conclusion may be that a truly harmless replacement is impossible and the chimera of a plasma substitute should no longer be pursued.

A review of the literature of actual experiments with hemorrhage shows that all investigators have ranked plasma as superior to saline solution, always on the same erroneous basis of comparing equal volumes. The superiority of plasma over salt solution has never yet been demonstrated by comparing not equal but optimal quantities of each for hemorrhage in normal animals. Observations by McKee and his collaborators[45] are of crucial importance. Even by comparison of equal volumes they found that the fluids for treating hemorrhage are, in descending order of effectiveness, whole blood, saline suspension

of red cells, plasma, and saline solution. In other words, the need for red corpuscles is preeminent, and the secondary hemodynamic need can be adequately supplied by saline.

These facts should receive more adequate attention in advices and preparations for an atomic bombing catastrophe and also for military campaigns in Korea and elsewhere. They may obviate the need for the prodigious or impossible quantities of plasma ordinarily demanded. Even believers in the superiority of plasma must accept the unanimous evidence of the great value of salt solution and must recognize its advantages of prompt and abundant availability in conditions of emergency and disaster. The present emergency furnishes urgent reasons for impressing these long-neglected facts upon physicians.

SUMMARY

The author reviews evidence of the important uses of reduced temperature treatment for radiogenic, mechanical and thermal injuries due to atomic explosion.

The value of salt solution for both shock and hemorrhage is emphasized. Insistence on exclusive use of plasma is deprecated, and the search for a colloid "substitute" is criticized.

However judgments may differ as to the benefits of these methods, their established value, together with their availability entitles them to a more important place in first aid instructions and in medical plans for the exigencies of atomic bombing or military campaigns.

RÉSUMÉ

L'auteur passe en revue l'évidence de l'emploi impertant d'une thérapie, de basse température pour les lésions d'origine radiogenique, mechanique et thérmique dues à l'explosion atomique. L'emploi de sérum artificiel pour le choc et l'hemorragie est demontré.

L'auteur condamne l'emploi exclusif de plasma et critique la recherche pour un subtituticolloídal.

Quoique les opinions diffèrent sur le bénéfice à obtenir à l'aide des différentes methodes recommandées, leur valeur est établie et leur facilité d'obtention leur confèrent une place de haute importance dans l'instruction pour les premiers secours et dans les plans médicaux pour rencontrer les exigences du bombage atomique et des campagnes militaires.

RIASSUNTO

L'A. passa in rassegna l'evidenza dell'impieghi importanti di terapia a temperatura riduttiva, pei danni radiogenichi, meccanici e termali a causa di scoppio atomico.

Il merito di soluzione salina per ambo shock ed emorragia viene accentuato. Insistenza sul uso esclusive di plasma e' dissuasa, e la ricerca pei sostituti colloidi e criticata.

Benche' opinioni potrebbero differire secondo i vantaggi dei metodi sostenuti loro valore fondato, insieme all 'efficacita' li intololano ad un posto piu importante nelle istruzioni del primo soccorso, e nei progetti medicale pelle esigenze del bombardamento atomico e campagne militari.

ZUSAMMENFASSUNG

Der Verfasser gibt einen Ueberblick ueber unsere Kenntnisse von den wichtigen Anwendungsmoeglichkeiten der Temperaturherabsetzung in der Behandlung von Verletzungen, die im Falle einer atomischen Explosion auf radiogenem, mechanischem und thermischem Wege entstehen.

Der Wert der Kochsalzloesung bei Schock und Blutungen wird betont. Der Verfasser glaubt nicht, dass man auf der ausschliesslichen Anwendung von Plasma bestehen sollte und kritisiert das Suchen nach einem "Kolloidersatz."

Wenn auch die Meinungen ueber den Erfolg der empfohlenen Methoden geteilt sind, so verdienen diese doch auf Grund ihres erwiesenen Wertes und wegen ihrer leichten Durchfuehrbarkeit einen wichtigeren Platz im Unterricht ueber erste Hilfe und in der aertzlichen Planung der im Falle der Anwendung von Atombomben und eines Krieges zu ergreifenden Notmassnahmen.

REFERENCES

1. Knowlton, N. P., and others: Beta Ray Burns of Human Skin, J.A.M.A. **141**:239-246, 1949.

2. Allen, F. M.: Local Asphyxia and Temperature Changes in Relation to Gangrene and Other Surgical Problems, Tr. Assoc. Am. Phys. **52**:189-194, 1937. The Tourniquet and Local Asphyxia, Am. J. Surg. **41**:

192-200, 1938. Resistance of Peripheral Tissues to Asphyxia at Various Temperatures, Surg., Gynec. & Obst. **67**:756-759, 1938. Ligation and Refrigeration of Intestine, Surgery **3**:893-898, 1938. Effects of Ligation on Nerves of the Extremities, Ann. Surg. **108**:1088-1093, 1938. Surgical Considerations of Temperature in Ligated Limbs, ibid., **45**:459-464, 1939.

3. Allen, F. M.: Experiments on Pelvic and Abdominal Refrigeration with Especial Reference to Traumatic and Military Surgery, Am. J. Surg. **55**: 451-466, 1942.

4. McElvenny, R. T.: The Effect of Cooling Traumatized and Potentially Infected Limbs, Surg., Gynec. & Obst. **73**:263-264, 1941.

5. Dziob, J. M., and Brown, R. K.: Reduced Temperature Anesthesia for Surgery of Trauma, Indust. Med. **12**:79-80, 1943. Miyakawa, G.: Refrigeration Anesthesia, with Special Reference to Treatment of a Severely Damaged Extremity Complicated by Visceral Injury, Am. J. Surg. **66**:384-386, 1944.

6. Mock, H. E., and Mock, H. E., Jr.: Refrigeration Anesthesia in Amputations, J.A.M.A. **123**:13-17, 1943. Mock, H. E., and Tannehill, E. H.: Fractured Pelvis Complicated by Gangrene of Extremity—Amputation Under Refrigeration Anesthesia, Surg., Gynec. & Obst., **78**:429-433, 1944.

7. Ottaway, J. P., and Foote, J. F.: Refrigeration of Wounded Extremities. U.S. Nav. Med. Bull. **43**: 1041-1043, 1944.

8. Ferguson, L. K.: Anesthesia Aboard a Hospital Ship in Combat Areas, U.S. Nav. Med. Bull. **43**:697-706, 1944. The Treatment of Burns and War Wounds, Bull. N.Y. Acad. Med. **21**:127-144, 1945.

9. Safford, F. K.; Lisa, J. R., and Allen, F. M.: Experiments on Local and Systemic Temperature Changes, Arch. Surg. **61**:499-514, 1950.

10. Bowers, W. F.: Refrigeration Therapy in Vascular Trauma, Military Surg. **83**:289-294, 1943.

11. Crossman, L. W.: Refrigeration for Crushed Finger, J.A.M.A. **130**:667, 1946. Kanaar, A. G.: Refrigeration in the Treatment of Trauma, with Review of Crymotherapy, Anesth. & Analg. **25**:177-190 and 228-242, 1946.

12. Blakemore, A. H.; Lord, J. W., and Stefko, P. L.: Restoration of Blood Flow in Damaged Arteries, Ann. Surg. **117**:481-497, 1943. Blakemore, A. H., and Lord, J. W.: A Nonsuture Method of Blood Vessel Anastomosis, J.A.M.A. **127**:685-691 and 748-753, 1945.

13. Nachlas, I. W.: Cited by Crossman, L. W.: Refrigeration for the Preservation of Traumatized Tissues, Canad. Hosp. J. **21**:30-32, 1944.

14. Webster, J. P.: Refrigerated Skin Grafts, Ann. Surg. **120**:431-449, 1944. Matthews, D. N.: Storage of Skin for Autogenous Grafts, Lancet **1**:775-778, 1945. Flatt, A. E.: Refrigerated Autogenous Skin Grafting, Lancet **2**:249-256, 1948; Observations on Growth of Refrigerated Skin Grafts, Brit. J. Plastic Surg. **3**: 28-33, 1950. Hanks, J. H., and Wallace, R. E.: Relation of Oxygen and Temperature in the Preservation of Tissue by Refrigeration, Proc. Soc. Exp. Biol. & Med. **71**:196-200, 1949.

15. Mock, H. E., Jr.: Refrigeration Anesthesia in Skin Grafting, Bull. Am. Coll. Surg. **28**:56, 1943; J.A.M.A. **122**:597-598, 1943. Gibson, T.: Surface Refrigeration Anesthesia for Cutting Split-Skin Grafts, Brit. J. Plastic Surg. **3**:6-11, 1950.

16. Schaubel, H. J.: The Local Use of Ice After Orthopedic Procedures, Am. J. Surg. **72**:711-714, 1946.

17. Webster, D. R.; Woolhouse, F. M., and Johnston, J. L.: Immersion Foot, J. Bone & Joint Surg. **24**:785-794, 1942. Greene, R.: Cold in Treatment of Damage Due to Cold, Lancet **2**:695-697, 1942. Bigelow, W. G.: The Modern Conception and Treatment of Frostbite, Canad. M.A.J. **47**:529-534, 1942. White, J. C.: Vascular and Neurologic Lesions in Survivors of Shipwreck, New England J. Med. **228**:211-222 and 241-247, 1943. Ungley, C. C.: Treatment of Immersion Foot by Dry Cooling, Lancet **1**:681-682, 1943. Allen, F. M.; Crossman, L. W., and Safford, F. K.: Reduced Temperature Treatment for Burns and Frostbite, N.Y. State J. Med. **43**:951-952, 1943. Liebesny, P.: Physiopathology, Treatment and Prevention of Frost Injuries, N. Y. State J. Med. **44**:2118-2123, 1944. Lesser, A.: Report on Immersion Foot Casualties from the Battle of Attu, Ann. Surg. **212**:257-271, 1945. Ungley, C. C.; Channell, G. D., and Richards, R. L.: The Immersion Foot Syndrome, Brit. J. Surg. **33**:17-21, 1945.

18. Allen, F. M., and Safford, F. K.: Experiments on Local Hypothermia for Treatment of Burns and Frostbite, Arch. Surg. **62**:515-523, 1950. Safford, Lisa and Allen.[9]

19. Yudin, S. S.: Refrigeration Anesthesia for Amputations, Am. Rev. Soviet Med. **2**:4-13, 1944.

20. Leonardo, R. A.: Continuous Bath Treatment of Burns, J. Internat. Coll. Surg. **10**:79-91, 1947.

21. Rose, H. W.: Initial Cold Water Treatment for Burns, Northwest Med. **35**:267-270, 1936. Rosenthal, S. M.: Effects of Local Therapy on Mortality from Shock, Pub. Health Rep. **57**:1923-1935, 1942; J.A.M.A. **122**:193, 1943. Elman, R.; Cox, W. M.; Lischer, C. E., and Mueller, A. J.: Mortality in Severe Experimental Burns as Affected by Environmental Temperature, Proc. Soc. Exp. Biol. & Med. **51**:350-351, 1942. Allen, F. M.; Crossman, L. W., and Safford, F. K.: Reduced Temperature Treatment for Burns and Frostbite, N.Y. State J. Med. **43**: 951-952, 1943. Mock, C. J.: Refrigeration in Surgery, J. Mich. State Med. Soc. **45**: 1344-1348, 1946.

22. Kross, I.: Low Temperature Therapy for Preservation of Limbs, J.A.M.A. **128**:19-20, 1945. Safford, F. K., and Nathanson, M. B.: Clinical Observations on Tissue Temperature, Arch. Surg. **49**:12-22, 1944 (reprint, with additions).

23. Brown, H. R., and De Lalla, V.: The Use of a Cold Room in Treatment of Hyperpyrexia and Burns, Arch. Phys. Med. **30**:98-192, 1949.

24. Allen, F. M.: Acute Arterial Injuries, J.A.M.A. **140**:974, 1949.

25. Freeman, N. E.: Acute Arterial Injuries, J.A.M.A. **139**:1125-1129, 1949.

26. Evans, E. J.: The Burn Problem in Atomic Warfare, J.A.M.A. **143**:1143-1146, 1950.

27. (*a*) Allen, F. M.: Physical and Toxic Factors in Shock, Arch. Surg. **38**:155-180, 1939. (*b*) Allen, F. M.: Experiments on theory and therapy of shock, Arch. Phys. Therapy **24**:327-335, 1943; New Experimental Aspects of Shock and its Treatment, Bull. N.Y. Med. Coll., Flower & Fifth Av. Hosp. **6**:61-65, 1943; Theory and Therapy of Shock: Excessive Fluid Administration, Am. J. Surg. **61**:79-92, 1943; Varied Fluid Injections, ibid. **62**:80-104, 1943; Treatment of Surgical Shock and Embolism, J. Internat. Coll. Surg. 423-435, 1944.

28. Allen, F. M.: Local Asphyxia and Temperature Changes in Relation to Gangrene and Other Surgical Problems, Tr. Assoc. Am. Phys. **52**:189-194, 1937; Reduced Temperatures in Shock Treatment, Am. J. Surg. **60**:335-348, 1943.

29. Fay, T.: Panel Discussion, Pennsylvania M. J. **46**:332, 1942; Cooling in Shock, J.A.M.A. **121**:1109, 1943.

30. Patey, H. D., and Robertson, J. D.: Compression Treatment of Crush Injuries of Limbs, Lancet **1**: 780-782, 1941.

31. Military Surgical Manuals, National Research Council. Philadelphia: W. B. Saunders Company, 1943.

32. Cole, W. H.: The Treatment of Shock with Special Reference to the Use of Heat and Cold, Arch. Phys. Ther. **24**:670-675, 1943. Sellers, E. A., and Willard, J. W.: The Effect of Plaster Bandages and Local Cooling on Hemoconcentration and Mortality Rate in Burns, Canad. M.A.J. **47**:461-464, 1943. Elman, R.; Cox, W. M.; Lischer, C., and Mueller, A. J.: Mortality in Severe Experimental Burns as Affected by Environmental Temperature, Proc. Soc. Exp. Biol. & Med. **51**:350-351, 1942. Wakim, K. G., and Gatch, W. D.: The Effect of External Temperature on Shock, J.A.M.A. **121**:903-907, 1943. Cleghorn, R. A.: The Effect of Different Environmental Temperatures on the Survival of Dogs After Severe Bleeding, Canad. M.A.J. **49**:363-367, 1943. Rossiter, R. J.: Plasma Loss in Burns, Bull. War Med. **4**:181-189, 1943. Antos, R. J.: Influence of Hypothermia and Hyperthermia on Survival Time of Dogs in Hemorrhagic Shock, Proc. Soc. Exp. Biol. & Med. **56**:60-63, 1944. Green, H. D., and Bergeron, G. A.: Effects of Environmental Temperature on Traumatic Shock Produced by Ischemic Compression of Extremities, Surgery **17**:404-412, 1945. Bergman, H. C., and Prinzmetal, M.: Influence of Environmental Temperature on Shock, Arch. Surg. **50**: 201-206, 1945. Ricca, R. A.; Fink, K.; Katzin, L. I., and Warren, S. L.: Effect of Environmental Temperature on Experimental Traumatic Shock in Dogs, J. Clin. Invest. **24**:127-139 and 149-151, 1945.

33. Davidson, E. C.: Sodium Chloride Metabolism in Cutaneous Burns and Its Possible Significance for a Rational Therapy, Arch. Surg. **13**:262-277, 1926.

34. Underhill, F. P.: Changes in Blood Concentration with Especial Reference to the Treatment of Extensive Superficial Burns, Am. Surg. **86**:840-849, 1927.

35. Mylon, E.; Winternitz, M. C., and de Sütö-Nagy, G. J.: Studies on Therapy in Traumatic Shock, Am. J. Physiol. **139**:313-324, 1943.

36. Rosenthal, S. M.: Production of Traumatic Shock in Mice: Therapy with Mouse Serum and Sodium Salts, Public Health Rep. **58**:1429-1436, 1943.

37. Allen, F. M.: Experimental and Clinical Observations on Hypothermia and Procaine, J. Internat. Coll. Surg. **11**:278-281, 1948. Allen.[18]

38. Katz, L. N.; Friedberg, L., and Asher, R.: Efficacy of Isotonic Sodium Chloride and Glucose Solution in Preventing Shock Following Venous Occlusion of a Limb in the Dog, Am. J. Physiol. **140**: 65-71, 1943. Scott, C. C.; Worth, H. M., and Robbins, E. B.: Comparative Value of Some Blood Substitutes Used for Treatment of Experimental Shock, Arch. Surg. **48**:315-318, 1944. Hechter, O.; Bergman, H. C., and Prinzmetal, M.: Comparison of Therapeutic Effectiveness of Serum and Sodium Chloride in Scald Shock, Am. Heart J. **29**:484-492, 1945. Harkins, H. N.: Sodium Therapy of Experimental Tourniquet Shock, Am. J. Physiol. **148**:538-546, 1947.

39. Fox, C. L.: Oral Sodium Lactate in the Treatment of Burn Shock, J.A.M.A. **124**:207-212, 1944.

40. Harkins, H. N.; Cope, O.; Evans, E. I.; Phillips, R. A., and Richards, D. W. (Committee appointed by Dr. A. E. Blalock, chairman of the Subcommittee on Shock): The Fluid and Nutritional Therapy of Burns, J.A.M.A. **128**:475-479, 1945.

41. Coller, F. A.: Campbell, K. M.; Vaughan, H. H.; Iob, L. V., and Moyer, C. A.: Postoperative Salt Intolerance, Ann. Surg. **119**:533-542, 1944.

42. Cutting, R. A.; Lands, A. M., and Larson, P. S.: Distribution and Excretion of Water and Chlorides After Massive Saline Infusions, Arch. Surg. **36**:586-613, 1938; Cause of Death Resulting from Massive Infusions of Isotonic Solutions, Arch. Surg. **38**:599-616, 1939. Cutter, R. K.: The Use of Large Volume Intravenous Injections, J.A.M.A. **106**:1250-1252, 1936.

43. The Protein Reservoir. Editorial, Brit. Med. J. May 8, 572-573, 1943.

44. Warren, J. V.; Merrill, A. J., and Stead, E. A.: The Role of the Extracellular Fluid in the Maintenance of a Normal Plasma Volume, J. Clin. Invest. **22**:635-641, 1943.

45. McKee, F. W.; Laycock, C. F.; Martens, T. G., and Nicholl, R. J.: Hemorrhagic Shock: The Relative Effect of Saline, Washed Red Cells and Heparinized Plasma in Dogs, Surg., Gynec., & Obst. **78**:509-514, 1944.

ADDITIONAL SOURCES

Brooks, B., and Duncan, G. W.: Effects of Pressure on Tissues, Arch. Surg. **40**:696-709, 1940; The Effects of Temperature on the Survival of Anemic Tissue, Ann. Surg. **112**:130-137, 1940; The Influence of Temperature on Wounds, ibid. **114**:1069-1075, 1941.

Allen, F. M.: The Status of Refrigeration for Military Surgery, Arch. Phys. Med. **26**:92-98, 1945: Broader Aspects of Refrigeration Anesthesia, Anesth. & Analg. **24**:51-65, 1945. Crossman, L. W., and Allen, F. M.: Principles of Surgical and Therapeutic Refrigeration, Surg. Clin. North America 361-370, 1945.

Allen, F. M.: The Newer Developments in Shock and Refrigeration, J. Internat. Coll. Surg. **8**:438-453, 1945; Refrigeration Anesthesia, J.A.M.A. **141**:347, 1949.

Chambers, R.; Zweifach, B. W.; Lowenstein, B. E., and Lee, R. E.: Vaso-Excitor and -Depressor Substances as "Toxic" Factors in Experimentally Induced Shock, Proc. Soc. Exp. Biol. & Med. **56**:127-129, 1944.

Zweifach, B. W.; Abell, R. G.; Chambers, R., and Clowes, G. H. A.: Role of the Decompensatory Reactions of Peripheral Blood Vessels in Tourniquet Shock, Surg., Gynec. & Obstet. **80**:593-608, 1945. Chambers, R., and Zweifach, B. W.: Blood-Borne Vasotropic Substances in Experiment Shock Am. J. Physiol. **150**: 239-252, 1947.

Hoitink, A. W. J. H.: Researches on the Colloid-Osmotic Pressure of Blood-Plasma and the Composition of the Blood After Acute Hemorrhage and After Intravenous Injection of Artificial Blood Substitutes, Acta Brevia Neerlandica **8**:42-45, 1938.

Pilcher, J. D., and Sollmann, T.: Studies on the Vasomotor Center; the Effects of Hemorrhage and Reinjection of Blood and Saline Solution, Am. J. Physiol. **35**:59-69, 1914.

Obstructive Jaundice Due to a Benign Tumor of the Extrahepatic Bile Ducts

Report of a Case

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OBSTRUCTIVE jaundice is most commonly due to a stone in the common duct, a stricture of the common duct, or a malignant lesion of either the ampulla of Vater or the head of the pancreas. Less commonly, icterus is caused by cysts in the biliary tract, benign tumors of the bile ducts or carcinoma of the common duct proximal to the ampulla or in the hepatic ducts. This report deals with a case of jaundice, unusual in that it was due to a benign sessile adenoma of the extrahepatic bile ducts. The true nature of the obstruction was unsuspected before operation. This case report is of particular interest because of the unusual postoperative complications necessitating heroic, although hopeless, measures.

REPORT OF CASE

W. S., a 47-year-old white man, was admitted to the Frankford Hospital on Dec. 29, 1947, with a diagnosis of "obstructive jaundice." The patient had been well until the day of admission, when he was attacked by intermittent pain in the upper part of the abdomen, occasionally severe enough to require morphine for relief. There was no radiation of the pain. No nausea, vomiting or change in bowel habit was observed. On December 25 the patient noticed that his urine was dark and his stools light, and that he was becoming icteric. No previous similar attack had occurred.

Physical examination revealed icterus as the abnormality. There were no abdominal masses, and the abdomen was not tender.

Laboratory studies confirmed the impression of "obstructive jaundice." A cholecystogram failed to visualize the gallbladder. After several days of intensive oral and parenteral preparation with protein, saline, dextrose and vitamins, operation was performed on Jan. 2, 1948.

With the patient under spinal procaine-pontocaine anesthesia, supplemented by pentothal and curare administered intravenously, a primary upper right rectus incision was made. Exploration of the abdominal cavity revealed no gross abnormalities in its lower part. Examination of the biliary tract disclosed a distended, thin-walled gallbladder which contained no stones, a dilated common duct, and a pancreas of normal size but firm. No stones or masses were felt along the course of the supraduodenal bile ducts. It was our impression at this time that we were dealing with an obstructing lesion along the course of the intrapancreatic portion of the common duct or the adjacent pancreas. Resective therapy was decided upon and a pancreatoduodenectomy was performed (Fig. 1). Although the cystic duct appeared to enter the hepatic duct well above the duodenum and at a right angle, transection of the common bile duct revealed the cystic duct to be running along the common hepatic duct in a common sheath, at least as far down as the pancreas (Fig. 2). This necessitated performing a cholecystectomy in addition to the pancreatic resection. Gastrointestinal and biliary-intestinal continuity was reestablished by an end-to-side choledochojejunostomy and an end-to-side anterior gastrojejunostomy. The former was placed about 10 cm. proximal to the latter. Although an attempt was also made to perform a pancreaticojejunostomy, the extreme friability of the pancreatic parenchyma and capsule forced us to abandon this procedure and merely to close over the cut end of the pancreas and bury it into the adjacent retroperitoneal tissues.

Examination of the resected specimen revealed a lesion in the common bile duct beginning approximately 1 cm. proximal to the papilla of Vater, involving the entire circumference for about 1 cm. along its course and completely obstructing the lumen. The cystic duct was seen entering the hepatic duct below the level of the lesion (Fig. 2). The pancreas was grossly normal. Microscopic examination of the lesion revealed a benign sessile adenoma (Figs. 3 and 4). The pancreas was entirely normal.

Postoperatively the patient received blood, intravenous proteins, dextrose, vitamins and large doses

From the Surgical Service of the Frankford Hospital.
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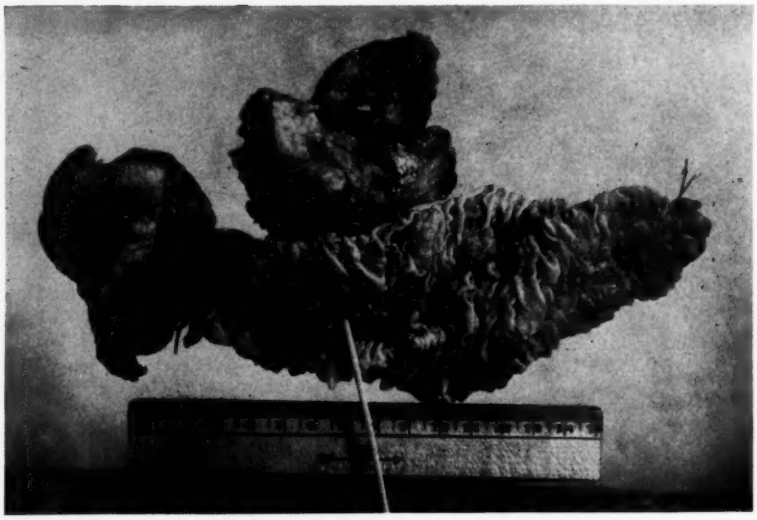

Fig. 1.—Resected specimen, consisting of the distal portion of stomach, entire duodenum and the proximal 2 inches (5 cm.) of jejunum. The portion of resected pancreas lies above. The indicator points to the papilla of Vater.

of penicillin and streptomycin. On the third postoperative day bile drainage appeared on the dressings, and on the seventh day gastrointestinal contents were also seen. All oral feedings were discontinued and continuous gastric suction instituted. In order to maintain nutrition, a jejunostomy was performed through an upper left muscle-splitting incision the following day. Three days later the fistula stopped draining and oral feedings were again started. The jejunostomy tube was removed a week later. The course was further complicated during this time by bilateral parotitis, which promptly responded to several roentgen treatments.

Three week after the primary operation the icterus had disappeared, the incision had healed and the patient was eating and gaining weight. He was afebrile. On January 23, the day he was to leave the hospital, the patient suddenly vomited a large amount of bright red blood and went into a state of collapse. This responded to blood transfusions. Similar attacks of hematemesis, syncope and tarry stools occurred almost daily. Though these attacks all responded rapidly to transfusions, it was felt that we could keep the patient's condition in a satisfactory state for only a short time longer. Therefore, afer his fourth hemorrhage, abdominal exploration was performed on January 29. With the patient under general anesthesia, a gastrotomy was performed. All the clots in the stomach were evacuated and the organ carefully examined. There was no active bleeding at this time, and except for an area of gastric erosion near the gastrojejunostomy no abnormality was observed. Our impression was that we were dealing

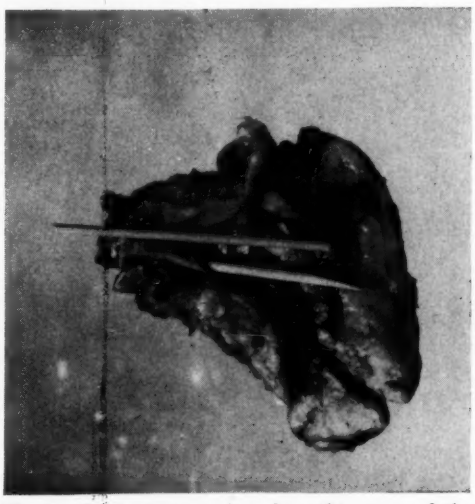

Fig. 2.—Cystic duct running along the course of the hepatic duct into the pancreas. The hepatic duct has been opened along its course. The cystic duct entered the hepatic duct at the level of the lesion.

with erosive gastritis of a type occasionally encountered after a gastrojejunal anastomosis. This portion of the stomach was resected and the opening in the stomach closed.

On the day after this operation there was a recurrence of bleeding. Two days after the operation the abdominal wound became infected and drainage was instituted. After several bouts of hemorrhage, with the patient's condition gradually deteriorating in spite of numerous blood transfusions, we decided that it would be necessary to reexplore the stomach, particularly near the cardia, and, if necessary, remove the entire gastric remnant. Therefore, on February 1, through a left transthoracic incision in the ninth interspace, the pleural cavity was entered. There was some free fluid in the pleural cavity, and there was fibrinous pleuritis of the base of the lung and adjacent diaphragm. The diaphragm was incised and the abdominal cavity entered. Above and below the left lobe of the liver there was a collection of very foul pus. This was evacuated. The cause of the subphrenic and subhepatic suppuration and the bleeding then became apparent. The gastric remnant was tense and there were numerous abscesses in its wall. When the cardiac end of the stomach was opened, these abscesses were seen to involve the entire thickness of the stomach, and one of them was adjacent to the left gastric artery and had eroded into it (Fig. 5). This was the source of the severe hemorrhages. The abscesses were multiple and involved the greater portion of the gastric remnant. It was surprising to us that we had failed to see them at the previous exploration several days before. Nothing less than removal of the gastric remnant was considered feasible. This was done, and an end-to-side esophagojejunostomy was performed. The diaphragm and chest were then closed around tubes for water-sealed drainage. During the operation, which lasted five hours, the patient's condition was critical, and although he regained consciousness, he died twelve hours later of pulmonary edema. An autopsy was performed, but added nothing to our previous observations.

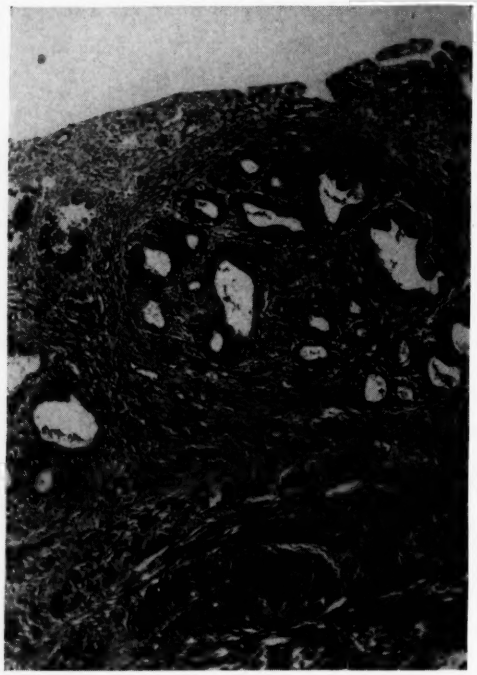

Fig. 3.—Low power microscopic section of the obstructing lesion. This pattern involved the entire circumference of the duct. There was no evidence of invasion.

Fig. 4.—High power microscopic section of the same specimen, showing its benign characteristics.

COMMENT

Benign tumors of the extrahepatic bile ducts have only infrequently been reported in the

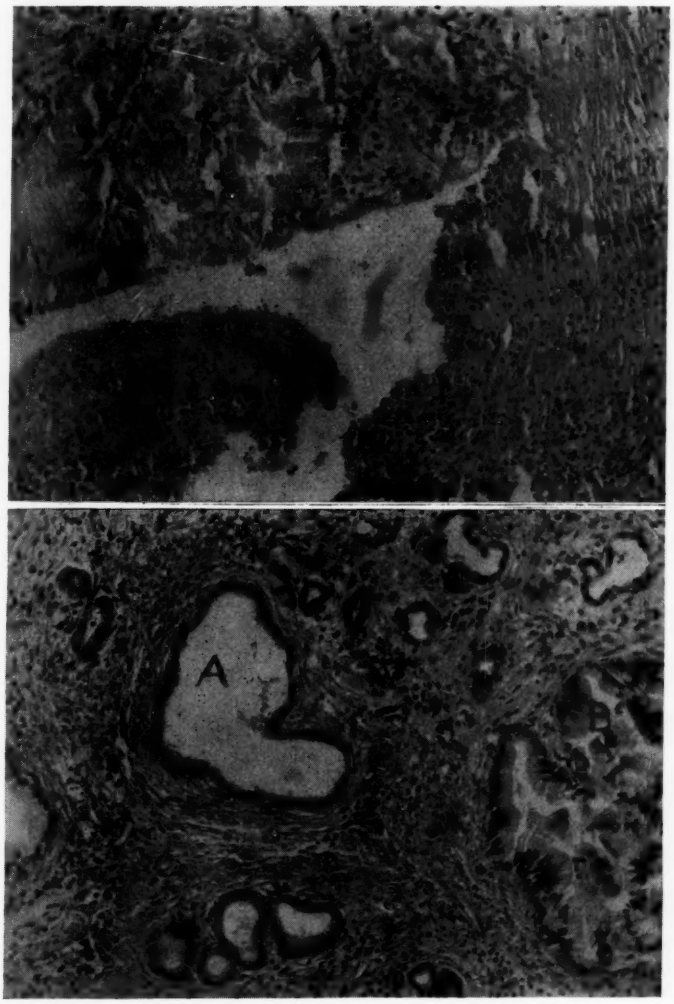

Fig. 5.—*Top*, microscopic section from the stomach wall of the gastric remnant, showing necrosis and sloughing of the superficial layers (*A*). The suppurative reaction is evident. *Bottom*, microscopic section of a lesion in the common duct of another patient, showing the transition from hyperplasia (*A*) to malignancy (*B*).

literature. These have included, in the main, adenomas (sessile and polypoid) and lymphogranulomas.[1] They are even less common than the rare benign lesions of the ampulla of Vater.[2] It is impossible to recognize the true nature of these growths before operation, and exploration is always done because of the obstructive jaundice present. Even at operation the surgeon may be unable to differentiate between a benign and a malignant lesion without removing the specimen for microscopic examination. In fact, this has usually been true of the cases reported in the literature, as well as in the one presented in this paper. There-

fore, a philosophic approach to the problem is taken at the operating table, all such lesions being considered malignant and extensive resection often being done. If, on the other hand, the surgeon adopts the attitude that resective therapy will not produce a long enough period of survival to justify the risk, a simple bypassing procedure may be adopted. It may be that many long survivals of so-called "malignant lesions" of the choledochus are really survivals from benign lesions, the true diagnosis never having been established. However, since such benign lesions are so infrequent and malignant ones so much more common, the burden of proof rests rather with the surgeon who leaves these growths *in situ*. In addition, it is not unreasonable to believe that malignant growths of this structure, as is true of other portions of the body, start as benign adenomas or merely as hyperplasia. Examination of various portions of carcinomas often do reveal hyperplastic areas, particularly at the anatomic extremities of the growth. An excellent example of this is shown by microscopic examination of the slides of tissues removed at autopsy from a patient who died of extensive carcinomatosis, the primary lesion being a minute growth in the common duct. At the periphery of the primary tumor extreme hyperplasia was observed, resembling closely the benign lesion in the case reported in this paper (Figs. 5, 6 and 7).

Another interesting feature of this case was the course of the cystic duct. On primary inspection it appeared that this structure entered the common duct at a right angle well above the pancreas. However, after the bile duct had been transected it was seen that the cystic duct was running parallel with and to the right of the main duct, in a common sheath, not entering the common duct until the pancreas was reached. This is of special significance, since, had a side-tracking procedure such as cholecystoenterostomy been done, the icterus would not have been relieved. There are many who advocate an anastomosis between the gallbladder and intestinal tract in cases of jaundice. We cannot agree with this, for two reasons. First, as has been mentioned, the cystic duct may not enter the common duct above the point of obstruction, in spite of the fact that it appears to enter high. Second, it is believed by many that use of the common duct is safer than use of the gallbladder, the pressure within the former being greater than in the latter, and tending to prevent ascending cholangitis.

The initial operation done on this patient embodied all the well-established principles of the "Whipple operation." Although it would have been more physiologic to anastomose the pancreatic duct or the pancreas to the jejunum, this was not done because of the small size of the pancreatic duct and the extreme friability of the pancreatic tissue and capsule. It was considered safer merely to close over the end of the pancreas. It has been shown on numerous occasions that digestion can be perfectly normal in the absence of pancreatic ferments, and, should steatorrhea develop, pancreatin given orally is usually effective. The choledochojejunostomy was placed proximal to the gastrojejunostomy to prevent the occurrence of ascending cholangitis. Leiter, in an interesting and exhaustive article has reported that infection of the biliary tract developed in each of his Whipple operations in which the gastrojejunostomy was proximal to the biliary-intestinal anastomosis and stated that a reconstruction similar to that done in our case would have been safer.[4] One of us (J.Z.) has also thoroughly reviewed this problem in a previous article.[5]

Suppurative Gastritis.—Unfortunately, the recovery of this patient was interrupted by the development of severe focal suppurative gastritis, involving by continuity the left gastric artery and resulting in massive hemorrhage from rupture of this vessel. Phlegmonous gastritis, though uncommon, has occurred often enough for us to be aware of the possibility of its development in the course of severe systemic infection or after a lowering of local tissue resistance as a result of operation or local disease (ulcer or carcinoma). In an excellent review of the literature, Eliason and Murray-Wright[6] observed that 42 per cent of 31 patients had antecedent gastric disease, in 32 per cent probably due to systemic infection and in 13 per cent probably the result of gastric operations. The organism most commonly observed was a streptococcus, although Staphylococcus, Pneumococcus, Bacillus coli, Bacillus proteus and even Bacterium welchi have been

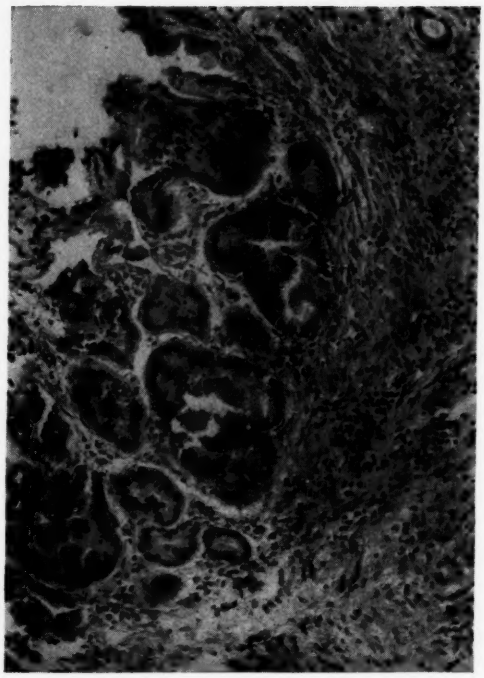

Fig. 6.—Low power microscopic section of the primary malignant lesion of the common duct in Figure 5.

isolated. Guy, Meyer and Brams[7] recorded a case of streptococcus bronchopneumonia with this condition. Gerster[8] expressed the opinion that injury of the mucosa by irritants was partly to blame. The last-mentioned author found phlegmon associated with ulcer or carcinoma in more than 50 cases, and felt that it was rarely a part of general sepsis. Exhaustion from hard labor and hypoacidity of gastric secretions have been considered as causes.[9] Sundberg[10] noted that 25 per cent of the patients indulged excessively in alcohol. Fink[11] was unable to produce the condition experimentally by injecting organisms into the gastric wall, although Doeble, cited by Vaughan,[12] produced cellulitis by feeding dogs alcohol, after which cultures revealed Streptococcus haemolyticus.

The clinical picture consists of the signs and symptoms of severe toxicity, together with local signs of pain and tenderness in the upper part of the abdomen, vomiting (sometimes of pus) and occasionally hematemesis. The diagnosis is rarely made before operation, but the local features of an acutely inflamed stomach, with or without subperitoneal abscesses, are characteristic.

Treatment has usually consisted of drainage of local abscesses. It is interesting to observe that many reported cases of recovery were cases in which the suppuration was observed coincidentally in specimens resected for ulcer or tumor, none of the aforementioned signs of sepsis being present.[6] It was a sort of pathologic curiosity. Whether any of these conditions would have progressed to diffuse suppuration is difficult to determine. The mortality associated with the far-advanced involvement has been high.

In our own case the diagnosis did not become apparent until the second operation to determine the site of the bleeding was done.

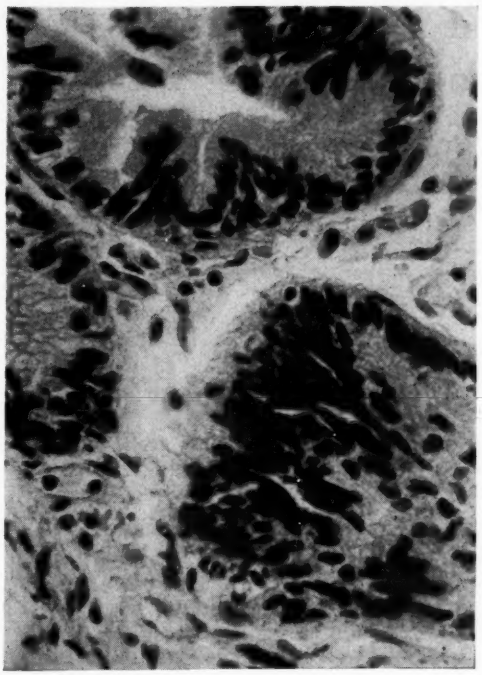

Fig. 7.—High power microscopic section of the specimen in Figure 6.

At no time after the first week was there any fever or epigastric pain. The suppuration had already extended beyond the wall of the stomach into the adjacent subphrenic spaces. The wall of the left gastric artery was eroded. The question might be raised as to whether the subphrenic infection was present first, involving the wall of the stomach and the gastric artery by continuity. This is unlikely, since numerous small abscesses were scattered in the gastric wall far distant from the subphrenic collection. In view of the extensive pathologic changes present, it became apparent that nothing less than removal of the gastric remnant would suffice.

SUMMARY

1. A case of obstructive jaundice due to a benign sessile tumor of the extrahepatic bile ducts is reported.

2. An interesting anomaly of the cystic duct and the development of phlegmonous gastritis of the gastric remnant, requiring radical although hopeless measures, are discussed.

RÉSUMÉ

1. Un cas de jaunisse obstructive due à une tumeur sessile et bénigne de conduits biliaires extrahépatiques est rapporté.

2. Une anomalie intéressante du conduit cystique et le développement du gastrite phlegmoneuse du bout gastrique demandant des mesures radicales (mesures pas toujours satisfaisantes) sont discutees.

ZUSAMMENFASSUNG

1. Es wird ein Fall von Obstruktionsgelbsucht, die durch einen gutartigen stiellosen Tumor der extrahepatischen Gallengaenge bedingt war, berichtet.

2. Eine interessante Anomalie des Ductus cysticus und die Entwicklung einer phlegmonoesen Gastritis des Magenstumpfes, die radikale (wenn auch hoffnungslose) Massnahmen erforderte, werden eroertert.

RESUMEN

1. Se da a conocer un caso de ictericia obstructiva debida a un tumor benigno sesil de los conductos biliares extrahepáticos.

2. Se discuten una interesante anomalía del cístico y el desarrollo de gastritis flegmonosa del remanente gástrico, que hubieron de tratarse radicalmente aunque sin esperanza.

RIASSUNTO

1. Deserive un caso d'itteriza ostruttivo causato d'un tumore sessile dei condotti extra epatica.

2. Discute un anomalo interessante del canale cistico e sviluppamento di gastrite flemmonoso del rimanente gastrico che richiede misure radicale (benché disperato).

REFERENCES

1. Leriche, R.: Massive Papillomatous Tumor of Choledochus in a Child, Lyon. Chir. **31**:581, 1934. Mayor, G.: Solitary Lymphogranuloma of Hepatic Duct, Ann. d'Anat. Path. **16**:977, 1940. Marshall, J. M.: Tumors of the Bile Ducts, Surg., Gynec. & Obst. **54**:6, 1932. McIntosh, A. M., and Gillies, A. D.: Two Tumors of Extrahepatic Bile Ducts, M. J. Australia **1**:268, 1940. Meade, H. S.: A Case of Papilloma of Common Bile Duct, Irish J. M. Sc. 1945 (Dec.). Rogers, K. E.: A Papillary Cystadenoma of the Common Hepatic Duct, Canad. M. A. J. **55**:597, 1946. Siniscalco, O.: Adenoma of Choledochus, Rev. Med. Quir. de Pat. Fem. **17**:260, 1941.

2. Brunschwig, A.: The Surgery of Pancreatic Tumors. St. Louis: The C. V. Mosby Company, 1942.

3. Greenfield, R. T.: Acute Phlegmonous Gastritis. Textbook of Surgery. Philadelphia: W. B. Saunders Company, 1936, p. 1108.

4. Leiter, H. E.: Carcinoma Involving Common Bile Duct, Surgery **22**:627, 1947.

5. Zaslow, J., and Counseller, V. S.: Suppurative Cholangitis Complicating Sidetracking Operations of the Biliary Tract, Surg., Gynec. & Obst. **83**:428, 1946.

6. Eliason, E. L., and Murray-Wright, V. W.: Phlegmonous Gastritis, Surg. Clin. North America **18**:1533, 1938.

7. Guy, C.; Meyer, K. H., and Brams, W. A.: Phlegmonous Gastritis, Surg., Gynec. & Obst. **44**:301, 1927.

8. Gerster, J. C. A.: Phlegmonous Gastritis, Ann. Surg. **85**:668, 1927.

9. Cutler, E. C., and Harrison, J. H.: Phlegmonous Gastritis, Surg., Gynec. & Obst. **70**:234, 1940.

10. Sundberg: Cited by Eliason and Murray-Wright.[6]

11. Fink, E. B.: Acute Primary "Idiopathic" Phlegmonous Gastritis, Boston, M. & S. J. **175**:795, 1916.

12. Vaughan, R. T.: Textbook of Surgery. Philadelphia: W. B. Saunders Company, 1936, p. 1108.

Nephroptosis

Some New Etiologic Conceptions

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NEPHROPTOSIS has been recognized as a distinct clinical entity and treated as such for many years, either surgically or by application of kidney belts or abdominal supports. The frequent complications of nephroptosis are being successively discovered and treated most effectively.

Nevertheless, it appears from a review of the literature that little has been added in the past forty or fifty years so far as etiologic factors are concerned. Our forefathers in this branch of medicine considered the ptotic kidney a result of (*1*) poor development of the fascial envelopes; (*2*) poor nutrition and relaxation of the abdominal walls, especially post partum; (*3*) trama; (*4*) general visceroptosis, with the kidney sharing the involvement, or (*5*) the shape of the renal fossae, shallow and elongated in the female or deep and pear-shaped in the male.

Several years ago my associates and I became interested in this subject purely by coincidence. We were called upon to examine and treat an extremely obese woman with typical right renal colic.

The patient was 40 years of age and had been overweight since birth. For the past seven or eight years she had had mild attacks of pain and discomfort in the right loin, radiating to the right groin; if she lay down, this would usually disappear. The most recent attack, however, had continued, and for the first time she had consulted her family physician for its relief.

A complete urologic study revealed a markedly ptotic kidney and moderate hydronephrosis. At operation a most interesting phenomenon was observed. A right renal muscle-splitting incision was made. The perirenal capsule was opened, and, as had been expected, there was no loss of the fatty pad. On attempting to mobilize the kidney in preparation for a nephropexy I observed a tough, fibrotic group of adhesions enveloping the entire lower pole of the kidney. These bands were in no way related or attached to Gerota's fascia, and on careful dissection they coursed downward in a fanlike manner and appeared to end in the sheaths of the quadratus lumborum and iliopsoas muscles. Although these bands would allow the kidney to ascend 3 to 4 inches (7.5 to 10 cm.), they would not permit it to assume its normal position. This was judged by the length of the ureter and the point from which the renal vessels arose from their respective main channels. Further investigation revealed no evidence of such adhesions at the upper pole. When these fibrotic bands were severed, the kidney could easily be placed in its normal position. So striking were these observations that it was decided to study carefully all ptotic kidneys that came to operation.

During the past eight years 50 patients with nehproptosis have been operated on, all of whom revealed anatomic arrangements almost identical with those just described, the only difference being in the density of the fibrotic bands. Believing that these conditions were purely congenital, we sought an explanation in the embryologic development of the kidney. In the fourth week of fetal life the caudal end of the nephrogenic cord, or metanephros, envelops the ureteral bud of the mesonephric duct like a cap. Elongation of this offshoot from the caudal end of the mesonephric duct forms the ureter; branching of its end forms the pelvis, the calcyes and the collecting tubules. The metanephros forms glomeruli and the secretory duct system, which eventually joins the collecting duct system. The fusion of metanephros and ureteral bud occurs in the pelvic area, and between the fourth and the

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sixth week of embryonic life both migrate cephalad to the lumbar region, a distance of 3 somites.[2]

It is conceivable that the kidney in its ascent might retain some attachments to its original site or to any point along its course. If it failed to ascend at all, the result would be a pelvic kidney, a not uncommon clinical phenomenon. The ascent usually occurs retroperitoneally, but occasionally the kidney becomes enveloped by peritoneum, another congenital variation clinically observed. In its ascent the kidney does not always completely lose its connection with mesodermal structures along its path. Fibrous bands often persist, and, if they are stronger than the attachments of the kidney in its permanent position, assumption of the upright position will allow the kidney to be drawn downward. If the ureter is fixed at any point above the level to which the kidney drops, kinking and urinary obstruction occur. Mere mobility without ureteral obstruction is often seen without symptoms and without damage to the kidney; it requires no treatment.

The patients operated on were subjected to thorough preoperative and postoperative studies. The decision to operate was based on the following clinical and laboratory data:

1. Persistent pain or discomfort in the loin of the affected side.
2. Definite abnormal excursion of the kidney.
3. Roentgen evidence of obstruction: (*a*) delayed emptying of the renal pelvis and the ureter (thirty minutes to one hour); (*b*) hydronephrosis, or (*c*) hydronephrosis and hydroureter.
4. Persistent infection of the urinary tract, refractory to all antibiotics.

Buford[3] described fine bands of connective tissue running downward parallel to the ureter in the ptotic kidney and insisted that they must be dissected off as an important part of nephropexy. Dodson[4] advised complete liberation of the kidney and ureter from adhesive bands as a necessary part of kidney suspension. Adhesive bands to the duodenum[5] and to the ascending colon[6] have been described, the former causing symptoms referable to the upper part of the gastrointestinal tract and relieved by division of the adhesions followed by nephropexy. My associates and I have also observed on many occasions that these fibrotic bands enveloped the ureter, particularly the upper and middle thirds, in various ways, producing mild to severe kinking.

SUMMARY AND CONCLUSIONS

The author records a series of 50 cases of nephroptosis. Forty of the patients were female and 10 male. Among the female patients, nephroptosis was bilateral in 1; in 4 it was present on the left side and in 35 on the right. In the male patients (10 in all) it was on the right side in every instance. The authors cannot account for the predilection for the right side and do not consider it the sole cause of nephroptosis, but in their opinion it is a definite contributory factor and may well be the chief etiologic factor.

RÉSUMÉ

L'auteur rapporte une série de 50 cas de néphroptose, 40 femmes et 10 hommes. Chez les femmes, la néphroptose fut bilatérale chez une; dans 4 cas, elle fut presente du côte gauche et dans 35 du côte droit. Chez les hommes, elle fut du côte droit dans chaque cas. Les auteurs ne peuvent pas expliquer cette prédilection pour le côte droit et ne la considèrant pas la seule cause de la néphorotose, mais dans leur opinion, c'est un facteur contributeur qui peut être le principal facteur étiologique.

ZUSAMMENFASSUNG UND SCHLUSSFOLGERUNGEN

Der Verfasser berichtet ueber eine Serie von fuenfzig Faellen von Nierensenkung. Vierzig davon waren Frauen und zehn Maenner. Unter den weiblichen Kranken lag in einem Falle eine doppelseitige Nierensenkung vor; in vier Faellen handelte es sich um eine linksseitige, in fuenfunddreissig Faellen um eine rechtsseitige Senkung. Saemtliche zehn maennliche Kranke hatten die Erkrankung auf der rechten Seite. Die Verfasser koennen keine Erklaerung fuer das Vorwiegen der rechtsseitigen Erkrankung geben. Sie glauben nicht, dass hier allein die Ursache der Nierensenkung zu suchen sei, sind aber der Meinung, dass ein beitragender, vielleicht sogar der hauptsaechliche aetiologische Faktor vorliegen koennte.

RIASSUNTO

L'A. registra una serie di 50 casi di nefrotosi. Quaranta pazienti femmine e dieci maschi. Fra le pazienti femmine nefrotosi, vi era un caso bilaterale; quattro al fianco sinistro e 35 a destra. Nei maschi 10 casi in ciascuno istanza a lato destro. Non calcolano la predilezione per la destra e non la considerano la causa unica del nefrotosi, ma l'opinione che sia un fattore contribuente definito e puó essere fattore principale etologica.

RESUMEN Y CONCLUSIONES

El autor revisa una serie de 50 casos de nefroptosis. 40 pacientes femeninos y 10 masculinos. En los pacientes femeninos, nefroptosis bilateral en 1, monolateral izquierda en 4 y monolateral derecha en 35. En los pacientes masculinos (10 en total) monolateral derecha en todos. Los autores no pueden explicar la predilección lateral derecha y no considerarla la única causa de nefroptosis, pero es en su opinión un factor contribuyente definido y puede bien ser el factor etiológico principal.

REFERENCES

1. Eisendrath and Rolnick: Urology, pp. 654-661.
2. Orey, L. B.: Developmental Anatomy, pp. 267-269.
3. Buford, C. E.: J. Urol. **55**:220, **1946**.
4. Dodson, A. I.: J. Urol. **50**:515, 1943.
5. Van Duzen, R. E.: J. Urol. **58**:340, 1947.
6. Herman: Practice of Urology.

The United States Chapter of the
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Case Reports

Beryllium Granuloma of the Web of the Thumb Following Injury

Report of a Case

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BLUFFTON, INDIANA

THIS study presents the important features of an injury to the web of the thumb by broken neon tubing followed by a beryllium granuloma. In addition, an analysis of 14 similar cases from the literature is included.

Literature.—Van Ordstrand, Hughes, DeNardi and Carmody[1] in 1945 reviewed the literature pertaining to the effects of beryllium and described cutaneous lesions and lesions of the respiratory tract suffered by workers in the beryllium industry. In addition to contact dermatitis and chronic ulcer of the skin, Grier, Nash and Freiman[2] discussed in detail subcutaneous granulomas developing after traumatic implant of beryllium compounds. Other authors[3] have added to the information made available by those mentioned.

Clinicopathologic Features. — The most striking features of these lesions are their chronicity and their tendency to recur after attempted removal. In general, most patients with beryllium granuloma of the skin have suffered a skin laceration from a broken fluorescent tube. The laceration may have been sutured primarily, or it may have seemed of insufficient extent to require surgical attention. After the skin has healed (occasionally it does not heal) there may develop one or more cutaneous and/or subcutaneous nodules of firm gray-white to yellow tissue, which ulcerate and continue to drain.

Recurrence is common after incomplete local excision, and many years may pass before complete cure is effected by radical excision, which may of necessity be mutilating to the part. In 1 case[3b] the lesion drained for four years before complete excision was effected. No migration and no regional lymph node spread has been observed.[3c] The local tissues are, however, involved by direct extension.

REPORT OF CASE

E. D., a white youth aged 16, sought treatment in February 1948 for an ulcer of the web of the left thumb which had recurrently opened and drained and closed spontaneously. Late in 1946, while his hands were covered with fluorescent powder, the web of the left thumb had been lacerated with a broken glass tube from a neon lamp. The diagnosis of foreign body granuloma was made and local excision performed. The wound continued to drain, however, and in August excision was again attempted. This wound also failed to

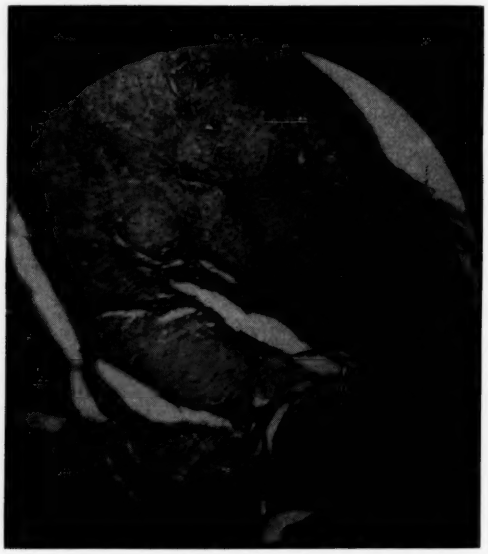

Fig. 1.—Nodular growth of chronic granulation tissue with a multinucleated giant cell (× 100).

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heal until July 1949, when wide excision of the ulcer and underlying granulomatous tissues was performed, with removal of a block of tissue measuring 3 by 1 cm. The granuloma was of firm, friable gray-white tissue and involved the skin, the subcutis and the adductor muscle of the thmub.

Examination five months later revealed no recurrence. Roentgen examination of the chest showed no evidence of pulmonary involvement. There was moderate disability of thumb movements.

Microscopically, sections of skin, subcutis and skeletal muscle (adductor pollicis) showed varying degrees of replacement by chronic granulomatous tissue (Fig. 1.) The latter was arranged in lobules incompletely separated by strands of compressed, collagenous connective tissue, with which they merged. The large lobules were composed of small confluent nodular whorls of immature connective tissue cells ("epithelioid cells") with relatively cellular centers and fibrous peripheries (Fig. 2). Within many of the small nodules were 1 or 2 multinucleated giant cells with eosinophilic cytoplasm and 3 to 6 oval nuclei, generally clumped in the center of the cell. No inclusion bodies were identified. In a few areas the centers of the large lobules were necrotic (caseation necrosis). Peripherally there was scant to moderate lympoid cell infiltration with a few plasma cells.

Analysis of the tissues excised revealed beryllium present in the concentration 0.14 gamma per 0.7 Gm. of moist, fixed tissue (0.2 gamma per 1.0 Gm.).

In fields showing no necrosis, the lesion simulated Boeck's sarcoid as described in previous reports. Apparently the degree of necrosis and lymphocytic infiltration and the concentration of multinucleated giant cells vary between cases. In this lesion the predominant feature was the nodular growth of cellular granulation tissue.

COMMENT

Chronic granuloma following the traumatic introduction of beryllium compounds into and beneath the skin will develop and recur unless complete débridement is done at the time of injury. Of interest is the observation that workers in whom pulmonary beryllium granulomatosis develops constitute only 6 per cent of those exposed.[2] It may be that the relative scarcity of cases such as those reviewed is in part due to failure to respond to the contaminating beryllium by the production of granulomas. To our knowledge, no report has been made of wounds contaminated with beryllium and failing to show granulomatous change. The incidence of beryllium granuloma will be decreased further by discontinuance of the use of beryllium phosphors in the manufacture of fluorescent tubes.

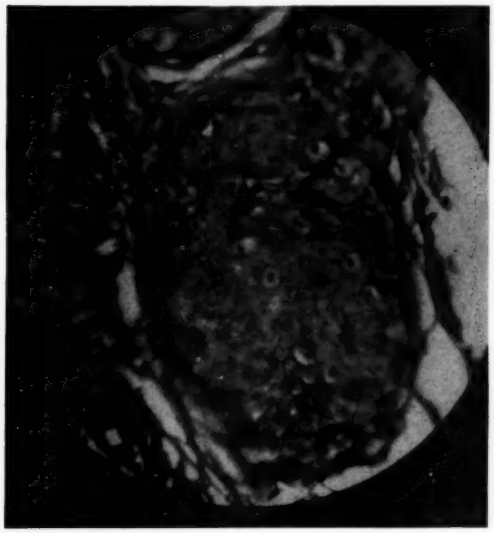

Fig. 2.—"Epithelioid" cells forming nodular whorls in the granuloma (× 440).

SUMMARY

1. A brief review is presented of the literature pertaining to chronic granulomas which follow cutaneous lacerations contaminated by fluorescent powder containing a beryllium compound.

2. One case of beryllium granuloma is reported. The tumor occurred in the web of the left thumb after laceration by broken neon tubing while the skin was covered with fluorescent powder.

3. Complete débridement or excision is necessary to prevent the development or recurrence of the granuloma.

4. Attention is called to the fact that only 6 per cent of persons exposed to beryllium compounds have pulmonary granulomatosis, and it is suggested that not all wounds contaminated by beryllium are liable to the development of granuloma.

RÉSUMÉ

1. Une brève revue est presentée concernant le granulome chronique consécutif aux lacéra-

tions cutanées contaminées par la poudre fluorescente renfermant un composé de beryllium.

2. Un cas de granulome dû au beryllium est rapporté. La tumeur se développa à la base du pouce gauche après lacération par un fragment de tube de néon, la peau étant à ce moment couverte de poudre fluorescente.

3. Un débridement complet ou une excision est nécessaire pour empecher le développement ou la récidive du granulome.

4. Il n'y a que seulement 6% des personnes exposées aux composés de béryllium presentent une granulomatose pulmonaire et il est suggéré que toutes les plaies contaminées par le béryllium ne développement pas la granulomatose.

RIASSUNTO

1. Esamina una breve rivista della letteratura appartenente a granulome chroniche seguente lacerazioni contaminati da polvere fluorescente contenente composto di Beryllio.

2. L'A presenta un caso. Il tumore rappresentato nel velo del pollice sinistro seguente lacerazione con tubo Neon spezzato mentre la pelle era coperta di polvere fluorescente.

3. Debridement completo od eccizione e' necessario prevenire sviluppamento o ritorno del granuloma.

4. Presta attenzione al fatto che solo 6 per cento delle persone esposti ai composti Beryllio soffrano del granulomatosi polmonare, e dichiare che non tutti feriti contaminate da Beryllio sono soggetto al sviluppamento del granuloma.

RESUMEN

1. Se presenta una breve revisión de la literatura referente a granulomas crómicos consecutivos a laceraciones cutáneas contaminadas por polvo fluorescente conteniendo un compuesto de berilo.

2. Se da a conocer un caso de berilogranuloma. Tumor en el tejido del pulgar izquierdo después de laceración producida por la ruptura de un tubo de neón con empolvamiento fluorescente cutáneo.

3. Se necesita la desbridación o excisión completas para prevenir el desarrollo o recurrencia del granuloma.

4. Se llama la atención sobre el hecho de que solamente el 6 por ciento de las personas expuestas a los compuestos de berilo tienen granulomatosis pulmonar, sugiriéndose que no todas las heridas contaminadas con berilo son susceptibles del desarrollo de granuloma.

ZUSAMMENFASSUNG

1. Es wird eine kurze Uebersicht der Literatur ueber chronische Granulome gegeben, die im Gefolge von Hautverletzungen, die mit fluoreszierendem berylliumhaltigom Pulver verunreinigt worden sind, entstehen.

2. Ein Fall von Berylliumgranulom wird berichtet. Die Geschwulst trat in der Falte zwischen dem linken Daumen und Zeigefinger auf, machdem eine Gewebszerreissung durch ein zerbrochenes Neonrohr stattgefunden hatte, waehrend die Haut mit fluoreszierendem Pulver bedeckt war.

3. Ein vollstaendiges Débridement oder vollstaendige Exzision ist notwendig, um der Entwicklung oder dem Widerauftreten des Granuloms vorzubeugen.

4. Es wird darauf aufmerksam gemacht, dass nur 6% aller Personen, die mit Berylliumverbindungen in Beruehrung kommen, eine Granulomatose der Lungen aufweisen, und es wird angenommen, dass nicht alle Wunden, die mit Beryllium verunreinigt sind, notwendigerweise zur Entwicklung von Granulomen fuehren muessen.

REFERENCES

1. Van Ordstrand, H. D.; Hughes, R.; DeNardi, J. M., and Carmody, M. G.: Beryllium Poisoning, J.A.M.A. **129**:1084 (Dec. 15), 1945.

2. Grier, R. S., Nash, P., Freiman, D. G.: Skin Lesions in Persons Exposed to Beryllium Compounds, J. Indust. Hygiene and Toxicol. **30**:228 (July), 1948.

3. (*a*) Coakley, W. A.; Shapiro, R. N., and Robertson, G. W.: Granuloma of the Skin at the Site of Injury by a Fluorescent Bulf, J.A.M.A. **139**:1147 (April 23), 1949. (*b*) Nichol, A. D., and Dominguez, R.: Cutaneous Granuloma from Accidental Contamination with Beryllium Phosphorus, ibid. **140**:855 (July 9), 1949. (*c*) Dutra, F. R.: Beryllium Granulomas of the Skin, Arch. Dermat. & Syph. **60**:1140 (Dec.), 1949. (*d*) Van Ordstrand, H. S.; Netherton, E. W.; DeNardi, J. W., and Carmody, M. G.: Beryllium Skin Granulomas from a Broken Fluorescent Tube: Report of a Case, Cleveland Clinic Quarterly **17**:34 (Jan.), 1950. (*e*) Neave, H. J.; Frank, Samuel B., and Tolmach, J. A.: Cutaneous Granuloma Following Laceration by Fluorescent Light Bulbs, Arch. Dermat. & Syph. **61**:401 (March), 1950.

Acknowledgments

Analysis of the excised tissues was made by Dr. L. Steadman, Atomic Energy Project, University of Rochester, Rochester, New York. The tissues were examined by Dr. James K. Scott of the same project.

Monoamniotic Twin Pregnancy

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MONOAMNIOTIC twin pregnancy is of sufficient rarity to warrant a report.

Mrs. C. D. R., a 28-year-old woman who had given birth twice and was pregnant for the third time, was first seen on Aug. 12, 1944, complaining of nausea and vomiting for fifteen days. The last menstrual period had occurred on July 20. The uterus was enlarged to the size of a three months' pregnancy. No physical abnormalities were observed except that the blood pressure in millimeters of mercury was 130 systolic and 98 diastolic.

The prenatal course was complicated throughout by nausea and vomiting, which necessitated admission to the hospital for a few days, beginning September 13. On Feb. 13, 1945, the patient began to exhibit slight edema, and the abdomen was large. A diagnosis of hydramnios with possible twins was made, although only one fetal heart beat could be heard. No roentgenogram was taken, for financial reasons.

On March 24 the patient complained of a sudden increase in fetal movements for approximately one hour. Fetal heart tones were heard the next day in the left lower abdominal quadrant, and no abnormality was observed.

On April 1, at 7:30 p.m., the patient went spontaneously into labor. At 11 p.m. the membranes ruptured spontaneously and a large amount of amniotic fluid was spilled. At 11:11 p.m. a low forceps delivery was accomplished, after left mediolateral episiotomy, of a viable male child weighing 6 pounds 1 ounce (2.8 Kg.). The second child, also male, presented by vertex, was born by podalic version and breech extraction and was macerated. The placenta separated spontaneously and was expressed manually. There was one placenta, with two cords intertwined and knotted into a cluster of knots that could not be separated. There was only one amniotic sac, with no indication of a partition remnant.

The postpartum course was uneventful, and the patient was discharged from the hospital on the fourth day.

COMMENT

Quigley, in a comprehensive review of monoamniotic twins in 1935, stressed the rarity of the condition and stated that from the time of the first report in the seventeenth century to 1935 he was able to find but 108 authentic cases, to which he added 1 of his own. Clinically, the chief interest is the danger of death of one or both of the fetuses from twisting or knotting of the cords. This results in a high fetal mortality rate, but there is no more risk to the mother than in any other twin pregnancy. In the 94 cases in which it was possible to estimate mortality, Quigley found the fetal death rate to be 68 per cent. Both twins survived in only 17 instances, both died in 42, and 1 died in 21. He reported 58 instances of true knot formation in the 109 patients, an incidence of 53 per cent.

Since Quigley's report, only 5 additional cases have been reported in America. In 1 case both twins survived (Parks and Epstein); 1 twin of Rucker's patient survived, and in the other 3 both twins died before the onset of labor. In all of these patients, including the one whose case is reported here, the cord revealed true knotting, changing the incidence to 55.6 per cent.

Of the 115 cases reviewed, both twins survived in only 18, a 15.3 per cent chance. The corrected mortality rate revealed 134 deaths among 200 babies, changing the death rate to 67 per cent.

SUMMARY

A case of monoamniotic twin pregnancy is reported. Both children were boys; 1 proved to be viable, the other was macerated. There was one placenta, with two cords knotted together. The postpartum course of the mother was uneventful.

RÉSUMÉ

Un cas de grossesse jumellaire monoamniotique est rapporté. Les deux enfants furent males; un était viable, l'autre etait macéré. Il y avait un placenta unique ayant deux différents cordons noués ensemble. La mere s'est retablit sans incident.

Submitted for publication Oct. 23, 1947.

Stillborn, macerated monoamniotic twin. Photograph shows knotted cord that caused death.

ZUSAMMENFASSUNG

Ein Fall von Zwillingsschwangerschaft in einem einzigen Amnion wird berichtet. Beide Fruechte waren maennlich; eine erwiess sich als lebensfaehig, die andere war mazeriert. Es war nur eine Plazenta vorhanden und beide Nabelschnuere waren fest miteinander verknotet. Was die Mutter angeht, so war der Verlauf nach der Geburt ein normaler.

RIASSUNTO

Un caso di gravidanza gemellare monoamniotico e' rapportato. Ambidue erano ragazzi; l'uno vitale, l'altra macerato. Vi era una sola placenta con due corde separti annodati strettamente. Il corso postpartum della madre era poco fecondo d'avvenimenti.

REFERENCES

Quigley, J. K.: Am. J. Obst. & Gynec. **29**:354-62, 1935.

Litt, S. and Straus, H. A.: Am. J. Obst. & Gynec. **30**:728-30, 1935.

Rucker, M. P.: Am. J. Surg. **28**: 175, 1935.

Parks, J. D., and Epstein, J. R.: Am. J. Obst. & Gynec. **39**:140-42, 1940.

Jones, W. E.: Am. J. Obst. & Gynec. **43**:130, 1942.

Boyle, J. B., and Richter, C. F.: Am. J. Obst. & Gynec. **53**:886-87, 1947.

New Cervical Collar for Injuries of the Neck

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WITH the advancement of the treatment of minor cervical injuries, there has been an increasing need of a cervical collar that is not only comfortable to wear but holds up under continuous use over a period of weeks or months.

The gap between the Schanz collar, other soft supports and the rigid cervical brace is a wide one. The semirigid collar here described was designed not only to fill this gap but to supplant the Schanz collar and offer an appliance that really gives support to the neck and permits varying degrees of hyperextension.

In adjusting this collar, the upper strap is tightened to such a position as to bring the forward ends of the collar to a comfortable position under the chin (see illustration). The lower strap is then tightened until a sufficient degree of hyperextension is attained.

The collar is being made in four sizes, and its cost is considerably less than that of a brace. It has been in the process of development for many months and will doubtless be further perfected during manufacture. It is decidedly an intermediate means of support between the Schanz collar and the cervical brace and is applicable to a wide variety of conditions.

RÉSUMÉ

NOUVEAU COLLIER CERVICAL POUR LE TRAITEMENT DES TRAUMATISMES DU COU

Avec les progrès dans le traitement des lésions minimes du cou, il y a un besoin important pour un collier non seulement confortable pour le malade, mais aussi qui se maintient pour un emploi continu d'une période de plusierures semaines ou mois.

La différence entre le collier de Schanz et d'autres supports mous et rigides du cou est grande. Le collier semi-rigide figuré di-dessus a pour but non seulement de remedier ce vide, mais aussi de remplacer le collier de Schanz et d'offrir un appareil qui forme un support pour le cou et qui permet différents degrés d'hyperextension.

En adjustant ce collier, la courroie supérieure est serrée de telle position à ce que la partie antérieure du collier soit confortablement placé sous le menton. La courroie inférieure est alors serrée afin d'obtenir un degré suffisant d'hyperextension.

Ces colliers sont faits de quatre dimensions et leur coût est raisonnable.

Depuis longtemps, ces supports sont en voie de développement et ont ete perfectionnés. Il est probable que d'autres perfectionnements seront apportes dans leur fabrication. Néanmoins, ils présentent de grands avantages et leur emploi est souvent indiqué.

EIN NEUER HALSKRAGEN IN DER BEHANDLUNG VON GENICKVERLETZUNGEN

Im Laufe der Entwicklung auf dem Gebiete der Behandlung leichterer Genickverletzungen hat sich ein wachsendes Beduerfnis nach einem Halskragen geltend gemacht, der nicht nur fuer den Patienten bequem tragbar ist, sondern der auch den staendigen Gebrauch ueber einen Zeitraum von mehreren Wochen oder Monaten gut aushaelt.

Die Kluft zwischen dem Schanzschen Kragen, anderen weichen Stuetzen und der starren Halsschiene ist weit. Der oben beschriebene halbsteife Kragen wurde nicht nur entworfen, um diese Luecke zu fuellen, sondern auch um den Schanzschen Kragen auszuschalten und durch einen Apparat zu ersetzen, der dem Halse eine wirkliche Stuetze gibt und gleichzeitig die Anwendung verschiedener Grade der Ueberstreckung gestattet.

Um dieser Kragen einzustellen, wird der obere Riemen so lange angespannt, bis die vorderen Enden des Kragens bequem unter

*This collar was developed with the aid of Mr. Robert G. Blair Jr. of Blair's Braces. Inc., Orlando, Florida.
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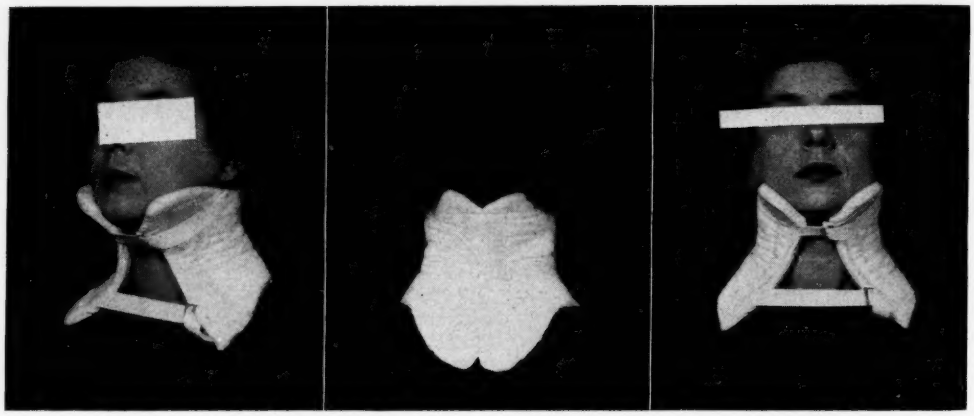

New cervical collar representing improvement over Schanz collar and usual cervical brace.

das Kinn zu liegen kommen. Dann wird der untere Riemen angespannt, bis ein ausreichender Grad der Ueberstreckung erreicht ist.

Diese Kragen werden in vier Groessen hergestellt und kosten erheblich weniger als Schienen.

Die oben beschriebene Halsstuetze befindet sich seit vielen Monaten im Stadium der Entwicklung und Vervollkommnung, und wahrscheinlich werden noch weitere Verbesserungen in ihrer Herstellung eintreten. Sie stellt ganz gewiss zwischen dem Schanzschen Kragen auf der einen und der Halsschiene auf der anderen Seite einen Mittelweg der Stuetzung dar, fuer den ausgedehnte Anwendungsmoeglichkeiten bestehen.

UNA NUOVO COLLARE CERVICALE PEL TRATTMENTO DI TRAUMATISMI DEL COLLO

Col progresso del trattmento di danni minori del collo vi e' stato un bisogno aumentando per un collare cervicale che non e' soltanto comodo al paziente di portare, ma ugualmento si sostiene sotto uso continuo al di la' d'un periodo di parecchi settimane o mesi.

Il cavo fra il collare Schanz, altri sostegni molli e la cinta cervicale rigida, e' largo. Il collare semi-rigida ritratto sopra e' stato designato non soltanto ad empire questo cavo, ma anche a soppiantare il collare Schanz ed offerire un mezzo che da' veramente al collo con diversi gradi d'iperestensione.

Nel aggiustamento di questi collari la fascia superiore e' stretta in tale posizione che porta le fini avanti del collare comodo sotto il mento. (Illustrato) La fascia inferiore poi va stingere finche' si arriva un grado bastante d'iperestensione.

Questi collari vengono in quattro grandezze, ed il prezzo e' considerabilmente meno che quello della cinta.

Il sostegno del collo lassu' illustrato e' stato nel corso dello sviluppo e della perfezione per tanti mesi, vi saranno propabilmente ancora miglioramenti nella manifattura. Intanto e' definitivamente un mezzo intermedio di sostengno fra il collare Schanz e la cinta cervicale, con ampiezza d'applicazione.

All will agree that a large proportion of the work of a medical student should be in the laboratory and in the hospital.—*Sir William Osler*

Sección en Español

Influência do Tipo de Anestesia no Tempo Operatório da Resseccão Gástrica

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AO focalizar a questão da influência do tipo de anestesia no tempo operatório da ressecção gástrica, não temos a intenção de fazer a apologia da rapidez nas intervenções cirúrgicas. Si é certo que reconhecemos as vantagens de se agir com rapidez no campo operatório, colocamos porém em primeiro plano o fator segurança, que de forma alguma pode ser menosprezado em favor da diminuição do tempo necessário para levar a cabo o áto cirúrgico.

Com o seu adextramento que se aperfeiçoa mais ou menos rápidamente, de acordo com habilidade individual, condições de aprendizagem e intensidade do traquejo — vae o cirurgião adquirindo a segurança de ação que o faz confiar em si próprio e lhe vae dando cada vez maior desenvoltura no campo operatorio. O grau de habilidade é fator individual que se póde, com esforço dirigido, aperfeiçoar acentuadamente; a aprendizagem adquirida em determinado Serviço pode sofrer evolução para melhor em viagens de estudo ou no convivio de congressos e de sociedades sábias; e o volume de serviço, si vultoso, oferece oportunidades sem conta para um amplo aprimoramento de técnica. Quando favorecido por esses três fatores ou quando procura tirar partido deles, o cirurgião logo se torna senhor do campo cirúrgico, agindo com segurança. Só então é que em sã consciência pode-se preocupar com a diminuição do tempo operatório. E é seu dever faze-lo, para que seus doentes se aproveitem das vantagens da rapidez do áto cirúrgico, entre as quais sobressaem quantidade menor de substâncias anestésicas, menores perdas de liquidos, menores probabilidades de choque, etc.

Não deve, pois, o cirurgião protelar rotineiramente um ato cirúrgico que o seu adextramento permite realizar em tempo bem menor que o gasto pelos cirurgiões com quem aprendeu ou trabalhou, si estes pertenciam a uma escola que operava por demais lentamente. Na mesma ordem de idéias, não se deve afoitar e querer agir muito depressa um cirurgião novo, ainda mal adextrado, que tenha feito ou esteja fazendo seu traquejo com cirurgiões habeis e rápidos.

O presente estudo é baseado numa série de intervenções consecutivas sobre o estômago, em que pudemos realizar a resseeção. Tomamos como ponto de partida o ano de 1935, quando já tinhamos cerca de 10 anos de convívio com a mesa operatória, prazo geralmente considerado suficiente para que o individuo adquira os foros de cirurgião e possa ingressar nas academias e na cátedra. Sem dúvida que o adextramento individual pode se aperfeiçoar depois desse prazo, mas a desenvoltura aí já adquiriu uma estabilidade tal que pouco poderá variar o fator individual nesse tipo de estudo a que nos propomos fazer.

A inclusão de todos os casos é um impositivo da finalidade visada: verificar a média do tempo operatório de determinada intervenção executada num mesmo Serviço, por um unico operador a relacioná-lo com o tipo de anestesia empregada. Assim, não foi excluido um só caso; mesmo aqueles que, por circunstâncias especiais, tiveram um ato operatório prolongado por 2 e até mais de 3 horas foram computados, como tambem foram computados aqueles extremamente faceis, em que à intervenção foi realizada na casa dos 30 minutos, registando 32½ minutos o tempo recorde.

Definimos como "tempo operatório" o tempo que decorre desde o inicio da incisão cutânea até a colocação do último ponto da pele. Em nossos casos, o tempo é marcado com a aproximação de um quarto de minuto. Assim, si o

*Diretor do Sanatório Sao Lucas.

QUADRO I.—*Influência do tipo de anestesia no tempo operatório da gastroduodenectomia parcial*

1-1-1935 a 31-10-1950

		No câncer		em outras indicacões	
Anestesia local		nº de casos	tempo medio	nº de casos	tempo médio
621		38	94,52	583	83,10
Anestesia geral	inalação	32	84,79	203	67,13
293	via venosa	1	87,00	57	66,72
Anest, raqueana	pura	24	59,77	388	59,35
464	associada	5	114,80	47	76,79
1.378—total		100		1.278	
	raque + local	3	106,66	40	73,84
	raque + inalação	1	147,00	6	92,91
	raque + venosa	1	107,00	1	98,00

O tempo é marcado em minutos e fração decimal de minuto.

cronômetro assinalou 58 minutos e 44 segundos, consignamos o tempo de 58 minutos e meio; si assinalou 58 minutos e 46 segundos, consignamos o tempo operatório de 59 minutos.

A influência do tipo de anestesia no tempo operatório da ressecção gástrica não é obsuluta, mas depende, em parte, da técnica seguida e da moléstia em causa. Si na grande maioria dos casos empregamos a ressecção a Polya, com boca total e anastomose retrocólica, em muitos casos fazemos a gastrojejunostomia antecólica e em alguns a gastro-duodenostomia á Bilroth I, devendo assinalar que tambem estão incluidos neste estudo os casos de úlcera jejunal posoperatória, nos quais o manuseio é geralmente dificil e por vezes muito acrescido o número dos tempos operatórios.

Nos casos de câncer, em geral o áto cirúrgico tambem é mais trabalhoso e, por conseguinte, mais demorado. Mesmo nas úlceras, condições locais de séde e estado da lesão e de comprometimento de outros órgãos, como aderências ao figado e á vesícula e perfuração do pâncreas, apresentam sensivel desigualdade para o manuseio do campo operatório, determinando uma elasticidade por vezes grande do tempo operatório. Deve-se levar em conta, tambem, a sincronização da equipe cirúrgica em ação, sabendo-se que o mesmo cirurgião quando trabalha com assistentes acostumados a sua técnica obtem maior rendimento do que quando trabalha com assistentes novos ou com aprendizes. Óra, em nosso Serviço mantemos um curso prático de aperfeiçoamento e frequentemente temos estágiarios intervindo conosco no campo operatório. É esse, sem dúvida, um fator desfavoravel em nosso Serviço para a obtenção de melhores tempos operatórios.

Todas essas circunstâncias concorrem para a variabilidade do tempo operatório, mas, numa estatística longa e de certo vulto, como a que aquí apresentamos, tais fatores podem ser considerados diluidos, de forma a não invalidar qualquer conclusão que se queira tirar ao comparar os dados obtidos na função do tipo da anestesia empregada.

Assim sendo, vejamos os números.

Em nosso Serviço, de 1935 a 1950 (até 31 de outubro), num total de quasi 16 anos, registamos 1.378 gastroduodenectomias parciais, sendo 100 por câncer e 1.278 por úlceras e outras indicações (gastroptose, lesões benignas, tuberculose, sifilis, hipertrofia em anel da musculatura do antro pilórico, diverticulo do duodeno).

Conforme o tipo de anestesia, os nossos casos podem ser assim distribuidos:

	nº	%
Anestesia local	621...	45,1
Anestesia raqueana	464...	33,7
Anestesia geral	293...	21,2
Total	1.378	100,0

Os dados relativos aos casos de câncer foram computados à parte, conforme o quadro geral aquí apresentado. Por eles se vê, de uma forma geral, que o tempo dispendido nessa indicação da gastrectomia é sensivelmente maior que o tempo gasto em outras indicações, a não ser nos casos em que a anestesia usada foi a raqueana, quando a diferença de tempo é apenas ligeiramente mais elevada. Isso se

compreende porque o cirurgião só emprega a raqueana em tais casos si lhe parece tratar-se de um tumor movel, de extirpação presumivelmente facil. E mesmo assim, em geral ele procura trabalhar depressa, temente de que termine a ação anestésica antes que esteja finda a intervenção. São esses os motivos porque a raqueanestesia pura nos deu um tempo operatório excelente e praticamente igual para qualquer indicação da ressecção gástrica.

Depois da raqueanestesia, a geral por inalação foi a que forneceu melhor tempo nas operações por câncer, seguindo-se-lhe a anestesia local, mesmo assim com a média relativamente boa de quasi 1 hora e 35 minutos. Nos casos mais dificeis, em que a raqueanestesia não foi suficiente e houve a necessidade de se associar uma anestesia complementar, a média de cinco casos abeirou-se das 2 horas. No que respeita ao câncer, esta estatística, embora pequena, apresenta a particularidade de consignar um número aproximado de casos para cada tipo de anestesia, pois que foram feitas:

Com anestesia local	38 casos
Com anestesia geral	33 casos
E com anestesia raqueana	29 casos
Total	100 casos

Passemos agora a analisar os números relativos ás intervenções em individuos não cancerosos.

Conforme o tipo de anestesia, estão assim divididas:

	nº	%
Sob anestesia local	583	45,62
Sob anestesia raqueana	435	34,03
Sob anestesia geral	260	20,35
	1.278	100,00

Essa porcentagem não exprime a tendência atual do Serviço. Com os progressos da anestesia geral por inalação em circuito fechado, associada ao uso do oxigenio e do curare, temos dado preferência, ultimamente, a esse tipo de anestesia, que nos permite trabalhar com sossego, sem o apressuramento que a raqueana nos impunha, apresentando, apezar disso, um tempo operatório que apenas ultrapassa de cerca de 7 minutos e meio o obtido com ela.

Abandonamos praticamente a anestesia local, não só por prolongar o áto cirúrgico, mas tambem por proporcionar maior incidência de complicações pulmonares posoperatórias e isso porque as picadas para a infiltração da parede despertam dores e forçam o doente a uma hipoventilação nas primeiras horas que se seguem ao efeito anestésico.

QUADRO II.—*Gastroduodenectomia Parcial—O tempo operatório na sequência dos anos*

Ano	nº de oper.	Câncer nº de casos	Câncer tempo médio em minutos	Outras indicações nº de casos	Outras indicações tempo médio em minutos
1935	32	2	118,0	30	96,3
1936	55	-	-	55	91,5
1937	61	3	94,0	58	86,7
1938	54	3	92,0	51	86,8
1939	49	1	104,0	48	88,8
1940	67	3	88,0	64	88,4
1941	63	8	104,6	55	84,1
1942	80	6	101,6	74	87,8
1943	126	10	87,1	116	74,8
1944	125	3	82,1	122	67,9
1945	100	6	63,2	94	61,7
1946	150	12	63,7	138	55,0
1947	107	8	87,6	99	63,9
1948	87	9	77,9	78	65,3
1949	133	18	85,0	115	67,4
1950	89	8	75,0	81	67,3
(até outubro)	1378	100		1278	

Observando as médias que obtivemos, verificamos que o tempo gasto foi, em números redondos:

83 minutos com anestesia local,
67 minutos com anestesia geral e
59 minutos com anestesia raqueana.

Passando em revista o quadro nº 2, em que consignamos o tempo operatório na sequência dos anos, e detendo-nos especialmente na última coluna, que consigna o tempo médio anual das intervenções em doentes não cancerosos — verificamos claramente a influência do tipo de anestesia no tempo operatório, uma vez que, no Serviço, houve predominância absoluta da anestesia local entre 1937 e 1942, ganhando terreno a anestesia raqueana nos anos seguintes, para atingir o seu acme em 1946 com a magnifica média de 55 minutos em 138 intervenções. Houve depois a passagem gradativa da raqueana para a geral em 1947 e 1948, para manter-se nestes dois últimos anos a predominância da anestesia geral com as médias de 67,4 e 67,3, praticamente a mesma.

Quando a ação da raqueanestesia não foi suficiente, obrigando a uma anestesia complementar, o áto cirúrgico se fez, em média, em 1 hora 16 minutos e 48 segundos. Si não fossem esses casos de anestesia insuficiente, em porcentagem apreciavel — 47 em 388 ou seja em 10,8% — e si pudessemos contar com anestésicos e metodos que evitassem a moléstia da raquicentese, tão frequente em nosso meio por questões meteorologicas, por certo a anestesia raqueana mereceria a nossa preferência para a ressecção gástrica.

Em outros logares, onde o fator atmosférico não influa na sequência das raquecenteses, hade continuar a anestesia raqueana disputando a primazia para as intervenções sobre o estômago.

CONCLUSÕES

1 — As gastroduodenectomias parciais por câncer são mais demoradas que as executadas por outras indicações.

2 — O tipo de anestesia influe no tempo operatório da ressecção gástrica.

3 — Tanto nos casos de câncer como no de outras afecções o tempo operatório decresce quando passamos da anestesia local para a anestesia geral e desta para a anestesia raqueana.

4 — Na anestesia geral, o tempo operatório médio é praticamente o mesmo quando se usa a inalação e quando se usa a via venosa.

5 — A raqueanestesia, em nossas mãos, foi insuficiente para o áto cirúrgico em pouco mais de 10% dos casos, exigindo uma anestesia complementar.

6 — O tempo operatório pode ser melhorado com o adextramento do cirurgião, a intensidade do seu serviço e a atuação de um grupo de auxiliares acostumados com a sua técnica.

7 — Jamais o tempo operatório deverá comprometer a segurança do áto cirúrgico.

It has occurred to me that one might define Art as: an expression, satisfying and abiding, of the zest of life. This is applicable to every form of Art devised by man, for, in his creative moment, whether he produce a great drama or carve a piece of foliage in wood, the artist is moved and inspired by supreme enjoyment of some aspect of the world about him; an enjoyment in itself keener than that experienced by another man, and intensified, prolonged, by the power—which comes to him we know not how —of recording in visible or audible form that emotion of rare vitality.

—George Gissing

Proposicion Para Nuevo Tratamiento de la Artritis Reumatoide

MIGUEL LÓPEZ ESNAURRÍZAR, M.D., F.I.C.S. (Hon.)*
MEXICO, D. F., MEXICO

TODOS estamos de acuerdo de que entre la Medicina y la Cirugía existen solamente límites convencionales y provisionales que se modifican diariamente movidos por el objeto fundamental de la Medicina que es curar. Hemos tenido la suerte de que por procedimientos de cirugía menor hallamos podido encontrar métodos que nos han parecido muy eficaces en padecimientos o síntomas cuya terapéutica ha sido médica. Esquemáticamente el camino recorrido ha consistido: 1. en el descubrimiento de la transmisión simpática del dolor visceral y su tratamiento por el bloqueo esplácnico prolongado; 2. mas tarde, la observación y demostración del efecto de recuperación visceral que el bloqueo puede producir en casos de deficiencias de numerosos organos, lo que nos ha permitido fundar el método esplacnoterápico de recuperación visceral; y 3. en fin, el tratamiento de padecimientos secundarios viscerales cuyo orígen es irritación simpática o esplacnitis. Todo esto nos ha conducido a modificar fundamentalmente el capítulo de la fisiopatología del simpático. El campo descubierto es grande; uno de los hechos mas interesantes es el de la artritis reumatoide, tema del que nos ocupamos ahora.

Nuestra observación inicial fué fruto de la casualidad y su explicación posterior. El Sr. Rafael Rodríguez nos consultó el 12 de marzo de 1947 en condiciones muy precarias y agudas de un padecimiento cuyo diagnóstico fué evidente: artritis reumatoide o poliartritis reumatismal evolutiva, con espondilosis rizomelica; su esqueleto intensamente deformado especialmente el vertebral. Contamos para el caso con la colaboración del competente neurólogo Dr. Roberto Gamboa con quien hicimos en mi Clínica la mielografía que demostró marcada alteración aracnoidea (goteo diseminado); ante toda incapacidad terapéutica de fondo y con mira sintomática, para mitigar los fuertes dolores, hicimos varias infiltraciones para-vertebrales, obteniendo en cada una de ellas mejoría subjetiva y objetiva al grado de que el (enfermo pudo volver) al trabajo que al principio fué ligero y pocos meses después normal. Su curación fué tan profunda que ante nuestra admiración, fuimos llamados en junio de este año a su domicilio, porque el Sr. Dn. Rafael había sufrido varios días antes, fractura de la clavícula izquierda; al caer ¡durante una competencia ciclista! Este caso, por circunstancias especiales, lo comenzamos a atender cuando el padecimiento estaba muy avanzado siendo así el resultado impresionante. Inmediatamente revisamos nuestras estadísticas de enero 1947 a agosto de 1949 encontrando que en ese período hemos tratado de la misma manera 68 casos de artritis reumatoide con alivio o curación completa de todos ellos aunque 60 de los casos fueron atendidos en sus fases iniciales y solo 8 ya en la fase cartilaginosa o esquelética del padecimiento. A la Academia Mexicana de Cirugía presentamos enfermos y documentación: Al Sr. Rodríguez como tipo de caso grave en fase esquelética, otro caso grave en fase cartilaginosa y otros con diversas localizaciones de predominancia vertebral, todos ya curados.

Comparemos ahora estos hechos con los trabajos de otras clínicas.

Entre la profunda obscuridad de la etiología "misterioso problema de la poliartritis crónica evolutiva" como se ha dicho, hay algunos hechos e indicios que conviene analisar. Los clínicos han observado repetidas veces curaciones espontáneas bajo dos condiciones: el embarazo y la ictericia. Para nosotoros la explicación que parece verosímil, lógica y que fortalece nuestra hipótesis es: el embarazo crea mejor circulación y nutrición suprarrenal y algunos padecimientos hepáticos con sindromo de ictericia, producen estasis circulatoria infra-hepática y en consecuencia aumento pasivo de la sangre suprarrenal, incremento circula-

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torio que es mecanismo del método esplacnoterápico; la misma curiosa pista ha servido a Hench, aconsejado por Kendall para experimentar una hormona cortico-suprarrenal, la 17 hidroxy-11 de hidrocorticostirona (llamado compuesto "E" o "Cortisona") y emplearla a muy fuertes dosis (por lo menos 100mlg. diarios). Los resultados sobre 16 P.C.E. fueron satisfactorios. En el VII Congreso Internacional de las enfermedades reumatismales (Nueva York 30 de mayo-3 de junio de 1949) presentaron una película magnifica. Desdichadamente la poliartritis se reconstituye en pocos días desde la cesación del tratamiento y además el compuesto no podrá producirse en cantidad appreciable antes de algún tiempo.

Estudiemos otra observación referida por el Dr. Philip S. Hench de la Sección de Medicina de la Clínica Mayo, en marzo de 1949; en su trabajo sobre "la capacidad de remisión de la artritis reumatoide" en cuya conclusión dice "la potencia curativa que parece dormir en cada paciente de esta enfermedad espera el estímulo superior del futuro" en uno de los párrafos del texto dice:

"En 1930 en la Clínica estudiamos la analgesia y el incremento circulatorio que sigue frecuentemente a la simpatectomía lumbar hecha para aliviar la artritis reumatoide de las extremidades inferiores. Pero como las extremidades superiores, cuyo sistema simpático estaba quirúrgicamente intacto, era frecuentemente aliviados casi tanto como las extremidades inferiores, concluímos que la anestesia general incidente al procedimiento operatorio. . . . era el común denominador."

Nos parece que esta observación fué una pista magnífica abandonada. A la luz de nuestras teorías haríamos la siguiente interpretación: la simpatectomía lumbar obra como tratamiento esplacnoterápico sobre las suprarrenales y funcionalmente al dolor generalizado al territorio del simpático. Ya hemos afirmado en nuestros trabajos de fisiopatología esplácnica sobre su funcionamiento integral semejante a unidad, que combate el pesado prejuicio de exclusiva distribución sistemátizada, creado por la idea preconcebida de analogía con los nervios de la vida de relación. También, como diferencia técnica, nosotros preferimos en general, en estos casos, la cirugía química a la cruenta por: menor agresividad, efecto en mayor superficie y volúmen, posibilidad de repetirlo o completarlo, mas rápida y mejor recuperación y menores complicaciones.

Con nuestra doctrina encontramos explicación sencilla y verosímil a muchas observaciones análogas que habían sido mal interpretadas que no hay lugar por ahora a analisar.

Otros padecimientos que se explican por deficiencia suprarrenal podrán tratarse: púrpura reumatoide, del que tenemos un caso muy demostrativo, (una Srita. que presentaba grandes placas faciales y de los pliegues articulares, que desaparecieron en 10 días); para la diabetes insípida tenemos anticipos pues por ejemplo Salmon dice "se ha notado la atenuación o desaparición de la poliuria después del bloqueo o la sección esplácnica"; hechos que ahora encuentran su explicación y base científica y que esperan confirmación estadística.

DISCUSION

Parece que hay suficientes argumentos para aceptar la hipótesis de insuficiencia suprarrenal como factor de la artritis reumatoide, hipótesis basada sobre todo en los trabajos de Hench y Kendall y que ha venido a comprobarse en otro aspecto al encontrarse que la simpatectomía o mejor el bloqueo simpático prolongado puede recuperar la víscera y lograr la curación de la artritis.

Siendo la artritis padecimiento hasta ahora misterioso y que ha curado por causas que no fueron explicables, podría ser que entre los casos observados por nosotros hubiera habido curaciones espontáneas, hecho que obliga a aumentar estadística. Entre los 68 casos observados por nosotros es probable que haya cierto número de padecimientos que no fueron artritis reumatoide porque en los períodos iniciales no puede hacerse el diagnóstico con certeza. En cambio es de demostración sencilla el alivio de los dolores y de la tumefacción articular que comienza pocos días después de la esplacnoterapia.

En el mejor de los casos cabe suponer que la esplacnoterapia podrá curar o mejorar aquellos padecimientos en los que no haya destrucción suprarrenal avanzada e incapacidad para recuperar casos muy graves en los que la "Cortisona" necesitaría suministrarse con-

tinuamente y casos límites o intermedios que la medicación y la recuperación podrán asociarse.

BIBLIOGRAFIA

1. Báez Villaseñor: El cuadro hemático en las enfermedades endócrinas. Rev. de Inv. Clin. enero-abril 1949 México.

2. Barquín, Fco. J.: A new technique of perirrenal air insufflation. J. Urol.. **57**:1, 1947.

3. Boucek: Nuevo método de tratamiento de la artritis reumatoide. Am. J. Med. Sciences. Phil febrero 1948.

4. Campana, C.: Splanchnicectomie gauche et surrénalectomie droite chez un sujet hypertendu suivies d'un syndrome addisonnien. Minerva Médica. Roma, noviembre 1948.

5. Hench, Philip S.: The potential reversibility of rheumatoid arthritis. Proc. Mayo Clin. **24**: marzo 30, 1949.

6. Langeron, L.: "Le purpura rheumatöide." La Presse Med. 11 de junio 1949.

7. López Esnaurrízar.: Acerca del tratamiento quirúrgico de los reumatismos hipercalcémicos. Ac. Mex. de Cir. y "Cir. y Cir." Tomo I no. 1, 1934, México.

8. López Esnaurrízar: Algias abdominales esplacnicas. Ac. Mex. de Cir. 10 de octubre 1944. Cir y Cir. Tomo XIII No. 1, 1945, México y J. Internat. Coll. Surgeons julio-agosto 1946, Chicago, Ill. E.U.A.

9. López Esnaurrízar: Dolores Mortales Ed. Uteha, 1947 México.

10. López Esnaurrízar: Méthode de recuperation viscerale. Chirugie de la douleur et des dystrophies splanchniques. Ac. de Cir. de París, 14 abril 1948 et Mem. de l'Ac. de Chir., Tomo 74 Nos. 11 y 12 París.

11. López Esnaurrízar: Surgery of pain. Royal College of Surgeons of England, 4 de mayo de 1948 y Annals of the Royal Coll. of Surg. of Eng. No. 3, marzo 1949, Londres.

12. López Esnaurrízar: Blockage of splanchnic nerves for relief of pain and splanchnic dystrophy VI As. Int. del Coll. Int. de Cirujanos, mayo 16-24, 1948, Roma, y J. Internat. Coll. Surgeons 1949, Chicago.

13. López Esnaurrízar: Nuevo método encefaloquirúrgico. Cirugía química nerviosa. El Día Médico, 24 de enero de 1949. Buenos Aires.

14. López Esnaurrízar: Método terapéutico para el sindrome hepaticiano. Soc. de Cir. de Córdoba, Argentina, Boletín No. 1, 1949.

15. Presse Medicale: VIIe Congres International des maladies rhumatismales. 16 juillet 1949.

16. Ricad A.: Hypertension paroxystique par médullo-surrénales tomie. Cuérison Chirurgicale. Jour. de Med. de Lyon, 5 Décembre 1948.

17. Robles Gil: Concepto generales y diagnósticos de la artritis reumatoide. Rev. de Inv. Clin. enero-abril 1949 México.

18. Salmon, Albert: L'élément surrénal dans la pathogenie du diabete insipide. Presse Med. 11 junio 1949.

19. Leriche, René: Paratiroides El Universal, junio 19, 1948 México.

20. Jung, A.: Comunicación al tema cirugía de la glándula pituitaria XIII Congreso de la Soc. Int. de Cir. Nueva Orleans octubre 1949.

21. Martin, Paul: Ponencia al tema cirugía de la glándula pituitaria XIII Congreso de la Soc. Int. de Cir. Nueva Orleans octubre 1949.

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Editorial

Organized Effort

It was a great day in the history of the human race when man first learned to take counsel of his fellows. It was a greater day when there emerged from this experiment the power of "seeing double" in human relations, of realizing that there are two sides to every question and that it is not impossible for one's antagonist to have the right view of the matter.

Out of these early struggles toward an erect posture of man's soul came folk-sayings, proverbs and adages passed from neighbor to neighbor, friend to friend, tribe to tribe, village to village and nation to nation—at first by word of mouth and later by that further victory of intelligence over chaos, the printed word. Experience tried these principles and proved their worth, and they were passed down from generation to generation, until now they can be considered the common property of the race even down to the children.

We have all grown up on such sayings as "In union there is strength," "It takes two to make a quarrel," "Two heads are better than one" and a hundred others of like sort. They have become so familiar as to be almost inaudible. When we hear one of them nowadays, which of us pauses to think what a giant effort of the mind and will, what an upward straining of every faculty of man's groping intelligence must have been required to produce it? For there was a time when the whole of human destiny might have been summed up in the grim and graphic colloquial expression "dog eat dog." We have come a long way since then.

It is not good, however, to go too far on a dark and tortuous trail without pausing once in a while to glance behind us. To lose sight of the past is to lose perspective for the future. Nowadays, when organized effort in hundreds of fields is the accepted mode of procedure among men everywhere, we need occasionally to take a backward glance; to reexamine the principles on which those efforts are founded, and to note whether in the exuberance of our activities we have strayed, or are in danger of straying, off the trail.

Every institution, said Emerson, is but the lengthened shadow of one man. Behind every organized group is a vision of some good to be accomplished and of the banding together of many minds to achieve it. The results of cooperative endeavor are nothing short of stupendous. The originator of the idea is frequently lost sight of as time goes on, and is usually content so to be if his dream is being brought to realization. But no such dream can be realized if the original idea is lost; and it is well to remember that every truism about cooperative effort has, like a coin, its obverse side:

In union there is strength. Yes. But there can be strength for evil as well as for good.

United we stand, divided we fall. Yes. But it is better to fall than to shift our ground, if the ground was good and fairly won in the first place. One may recover from a tumble; but the habit of compromising with an ideal is metastatic and seldom curable.

Leadership in a great organization provides a man with an unparalleled opportunity to serve his fellows. Yes. But it also provides him with an unparalleled opportunity to serve himself. If a man in the position of a leader centers his ambitions wholly upon aggrandizement either of himself or of the organization, he can do harm. When the organization becomes more important than what it stands for, the result is corruption.

These facts are surely self-evident to any thinking man. They apply equally to organizations of scientists, educators, ecclesiastics, industrialists or artists. What every organization needs to become and remain vitally effective are dedicated leaders and a dedicated membership; leaders and members who hold it their highest duty in those capacities to keep perpetually before them, first of all, the principles upon which the organization is based.

The prosperity of the organization as such is important, but it must take second place. The aggrandizement of the individual leader or member is incidental. Honest efforts are recognizable, after all; there is little danger that they will go unregarded. Even if they did, there are other and more suitable fields for personal ambition.

The well established custom in scientific, artistic and scholarly groups of conferring "fellowships" is more than a custom, and the word selected is more than a random appellation. It expresses exactly the quality desired. Fellowship signifies more than cooperation. It signifies also good will, a generous attitude and a certain amount of humility. It excludes self-interest, self-aggrandizement, and political maneuvering for place. It implies first and foremost that the holder of the degree has been honored by his colleagues with the assumption that he is a first-rate human being as well as a first-rate professional man, and that he can be relied upon to keep that distinction in mind and do nothing to besmirch it.

Every member and every official of an organized group is in the position of a trustee, and the trust he guards is the organization's ideal. Since (except in the case of open and flagrant transgression) no penalty can be attached to abuse of this fiduciary obligation, it becomes a matter of simple honor and decency not to abuse it.

Fortunately those who do abuse it are rare; but the abuse of it by even one member, particularly a prominent member, can do untold harm. In the first place, it creates confusion of purpose within the group and opens the door to fanaticism, which has been aptly defined as redoubling one's efforts after forgetting one's aim; in the second place, it creates suspicion and distrust of the organization in outsiders, whose good will and cooperation are thereby lost. Just in proportion to the growth and success of an organized group must its integrity be jealously watched and defended, lest its mighty strength be diverted from the channel.

M. T.

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New Horizons

By the Editor

The Jenner Bicentenary

Two hundred years after the birth of Edward Jenner it is hard to realize, except in the academic sense, the change this single man has made in the world. Our forefathers had a more poignant realization of it—and with what good reason! In Iceland alone in the year 1707, eighteen thousand of a total population of fifty thousand died of smallpox. In 1796 the disease claimed the lives of thirty thousand Prussians. Six million died of it in Mexico. The total eighteenth century toll was about sixty million. Thomas Babington Macaulay, in his famous *History of England*, described its ravages in an unforgettable manner:

"Smallpox was then the most terrible of all the ministers of death. The havoc of the plague was far more rapid; but the plague visited our shores only once or twice within living memory; and the smallpox was always present, filling the churchyards with corpses, tormenting with constant fears all whom it had not yet stricken, leaving on the lives of those it spared the hideous traces of its power, turning the babe into a changeling at which the mother shuddered, and making the eyes and cheeks of the betrothed maiden objects of horror to the lover."

Our own Thomas Jefferson wrote to Jenner: "You have erased from the calendar of human afflictions one of the greatest. Yours is the comfortable reflection that mankind can never forget that you have lived; future nations will know by history only that the loathsome smallpox ever existed, and by you has been extirpated."

Jefferson's prophecy has all but come true already. In a very genuine sense we now know of smallpox almost entirely as a matter of history. As yet, perhaps, we are in no danger of forgetting that Jenner existed; but he is, like all other great men, becoming dim in the distance, a figure of high and permanent tradition: in other words, a name. It is both moving and delightful to be reminded of his humanity; to be told of his delight in nature and poetry, and of the warmth, gentleness and lack of ostentation in his personality. The most callous among us can scarcely fail to feel a pang of guilt at the pathetic remark he made shortly before his death: "I am not surprised that men are not thankful to me" (imagine it!), "but I wonder that they are not grateful to God for the good which He has made me the instrument of conveying to my fellow-creatures."

These memorabilia are duly and beautifully brought to us in a pair of volumes recently issued. One of these, containing Jenner's own account of his investigations, is reviewed elsewhere in this issue of the *Journal*. The other, a memorial tribute by Nolie Mumey, published by the Range Press of Denver, Colorado, is entitled "Vaccination: Bicentenary of the Birth of Edward Jenner," and contains the quotations just given, as well as the inscription on Jenner's tomb:

> "... Let rescued infancy his worth proclaim,
> And lisp out blessings on his honor'd name;
> And radiant beauty drop one grateful tear,
> For beauty's truest friend lies buried here."

It contains, in addition, numerous portraits of the great discoverer, as well as an engraving of the vicarage in which he was born. Limited to a signed edition of two hundred copies, this little book is a treasure well worth cherishing. But with or without the book, no thoughtful man or woman can deny or wish to deny the individual debt every one of us owes to Edward Jenner. All honor to his memory, now and forever. The light he kindled, even dissolved as it now is in "the light of common day," is one that will never be quenched.

Chapter News

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United States Chapter

ARNOLD S. JACKSON, M.D., F.A.C.S., F.I.C.S., Secretary

Chicago Assembly: At the Sixteenth Annual Assembly of the United States Chapter of the International College of Surgeons, to be held at the Palmer House in Chicago on September 10-13, 1951, a Scientific Exhibit of more than usual interest and value will be presented, exemplifying in concrete and visible form the tremendous strides recently taken in the development of medical and surgical equipment, facilities and literature. Exhibitors who wish to participate are requested to communicate promptly with **Dr. Arnold S. Jackson,** Secretary, United States Chapter, 1516 Lake Shore Drive, Chicago 10, Illinois.

Another outstanding feature will be a Cineclinic to usher in the outstanding Assembly program. The Cineclinic will be held on the evening of Monday, September 10, with presentation in the form of motion pictures. This method of illustration has already proved as valuable as it is up-to-date, and the Cineclinic should not be missed by anyone attending the Assembly. Further details may be obtained from Dr. Jackson at the aforementioned address.

A formal announcement of the Chicago Assembly appears elsewhere in this issue of the *Journal.*

The general program is nearing completion. The large group of outstanding surgeons who will participate assures another splendid assembly. As an attendance of 3,000, or more, is anticipated, members of the College are advised to secure their hotel and banquet reservations now.

Dr. Chester W. Trowbridge is again acting as Chairman of the Banquet Committee, and he announces that reservations will be available for only 1,300; of these, 300 will be balcony seats.

Atlanta Meeting: Approximately 150 surgeons attended the Sectional Meeting of the International College of Surgeons, U. S. Chapter, held at the Atlanta Biltmore Hotel, Atlanta, on January 11, 12, and 13. Surgeons from the following states were in attendance: Georgia, Alabama, Florida, Tennessee, South Carolina and Mississippi.

Drs. William Perrin Nicolson and **T. C. Davison,** two of Atlanta's most distinguished surgeons, were co-chairmen of the meeting. They were assisted by the following committees:

Program Committee

B. T. Beasley, M.D., *Chairman*
Exum Walker, M.D.
Wadley Glenn, M.D.
L. Minor Blackford, M.D.

Entertainment Committee

Shelley Davis, M.D., *Chairman*
B. L. Shackleford, M.D.
Lester Brown, M.D.,

Hotel and Assembly Committee

Harris Dew, M.D., *Chairman*
H. E. Steadman, M.D.
L. G. Baggett, M.D.

Publicity Committee

A. H. Letton, M.D., *Chairman*
Olin Cofer, M.D.
John Ivey, M.D.

Finance Committee

W. W. Daniel, M.D., *Chairman*
James H. Byram, M.D.
Harold McDonald, M.D.

Registration and Reception Committee

Spencer Kirkland, M.D., *Chairman*
J. B. Avera, M.D.
L. J. Goodman, M.D.

Exhibits Committee

James H. Byram, M.D., *Chairman*
Frank Eskridge, M.D.

Dr. Hal Davison, President of the Fulton County Medical Society, presided at the opening session, which was held Thursday evening at the Academy of Medicine. At this meeting **Dr. Laurence S. Fallis,** Detroit, gave a paper on "The Incidence of Marginal Ulceration after Gastrectomy in Patients With and Without Coincidental Vagotomy." **Dr. Raymond W. McNealy,** of Chicago, spoke on "Ulcerative Colitis—a Problem."

The Friday morning session, held at the Atlanta Biltmore Hotel, was opened by a paper by **Dr. C. D. Davis, Durham, N. C.,** "Male Pseudohermaphroditism: Some Endocrinologic and Psychosexual Aspects." An interesting paper by **Dr. Herbert Acuff,** of Knoxville, Tennessee, "Lesions of the Lower Esophagus and Cardiac End of the Stomach," was illustrated with some fine slides.

Dr. Amos R. Koontz, of Baltimore, spoke on "Tantalum Mesh in Hernia Repair" in a series of 147 cases. **Dr. Raymond McNealy** read a paper entitled "Trends in the Treatment of Carcinoma of the Left Colon" for **Dr. Karl A. Meyer** of Chicago, who was unable to attend. **Dr. Calvin Stewart,** of Atlanta, discussed "Cancer of the Mouth," illustrating his talk with some excellent Kodachrome slides.

An excellent paper on "Postoperative Abdominal Wound Dehiscence," based on a series of 515 cases, by **Dr. Harry E. Bacon** and **Dr. Howard D. Trimpi** of Philadelphia was presented by the latter. **Dr. Claude J. Hunt,** of Kansas City, gave an instructive discussion of the "Surgical Treatment of Cancer of the Colon," based on a study of 357 cases.

"Surgical Lesions of the Neck" was the title of a presentation by **Dr. Arnold S. Jackson** of Madison, Wisconsin, who emphasized the importance of early diagnosis and treatment.

Dr. Laurence S. Fallis, of Detroit, reviewed a series of 250 cases in his paper on "Acute Pancreatitis." **Dr. Irvin Abell,** of Louisville, reviewed a series of 345 cases to ascertain the "Early Symptoms of Late Carcinoma of the Colon." **Dr. Frank L. Meleney** of New York, spoke on "Further Experiences with Bacitracin in the Treatment of Surgical Infection."

Dr. Philip Thorek presented a fine paper, beautifully illustrated by slides, on "Recent Trends in Esophageal Surgery." An interesting discussion on "Tumors of the Ovary: Endocrinal and Other Rare Ovarian Tumors" was presented by **Dr. Gilbert F. Douglas,** of Birmingham, recently elected Chairman of the Section on Gynecology and Obstetrics of the International College of Surgeons, U. S. Chapter. "The Diagnosis and Surgical Treatment of Cervical Intervertebral Disc Lesions" was the subject of a splendid paper by Dr. Exum Walker, Atlanta.

Panel discussions of all papers were conducted by **Drs. W. W. Daniel** and **A. H. Letton,** of Atlanta. After the Thursday session, a cocktail party was given at the Biltmore Hotel for the surgeons and their wives, followed by dinner at the various clubs. This meeting was one of the finest sectional sessions ever given by the College and was a real stimulus to the development of the organization in the Southeast.

A Georgia Chapter was organized at a luncheon meeting, attended by 40 surgeons. **Dr. W. Perrin Nicolson** was elected president; **Dr. Ben T. Beasley,** vice-president, and **Dr. A. H. Letton,** secretary. In 1952 the Southeastern Sectional Meeting will be held at Birmingham.

Sectional Meetings: Plans are now well formulated for Sectional Meetings to be held in various parts of the country during the spring and summer months. Those seeking information on these meetings are requested to write to Miss Alma D. Case, Executive Secretary, at the Chicago office, 1516 Lake Shore Drive, Chicago.

International Board of Occupational Surgery: At a recent meeting the Executive Council of the United States Chapter, International College of Surgeons, and the International Board of Trustees unanimously approved the formation of an International Board of Occupational Surgery, with **Dr. Frederick W. Slobe, F.A.C.S., F.I.C.S.,** as Chairman and **Dr. E. C. Holmblad, F.A.C.S.,** as Secretary. The need of such a Board has long been apparent. The surgery of occupational injury and disease, particularly the former, is a large and complicated field, and the issues appertaining thereto are subject to confusion. The principal aims of the new Board will be as follows:

1. To work toward elevated standards of practice in occupational surgery.

2. To conserve the health and efficiency of the worker after recovery from occupational injury or illness.

3. To obtain official recognition of occupational surgery as a specialty.

4. To stimulate interest in this specialty among students as well as established surgeons.

5. To cooperate in the establishment of facilities for graduate training in occupational surgery by means or residencies in hospitals affiliated with medical schools, or their equivalents.

The creation of the International Board of Occupational Surgery is thoroughly in line with the general aims and purposes of the International College of Surgeons and should prove its practical value from the beginning. Great progress can be made by enlisting the interest of young surgeons in training as well as by utilizing the wisdom, skill and judgment of the experienced surgeon. Those who wish further information concerning the Board and its proposed activities may obtain it by writing to Dr. Arnold S. Jackson, Secretary, United States Chapter, International College of Surgeons, 1516 Lake Shore Drive, Chicago 10, Illinois.

Recent Honors: Dr. James T. Case, F.A.C.S., F.I.C.S., Emeritus Professor of Radiology of Northwestern University, was awarded a gold medal by the Radiological Society of North America at its annual meeting in the Palmer House, Chicago, for distinguished achievements in the field.

Mexican Chapter: Prof. Dr. Manuel A. Manzanilla, F.I.C.S. (Hon.), Vice-President of the International College of Surgeons, has been decorated by the Cuban Government with the Order of Honor Jose Marti.

Prof. Dr. Ramon Osorio y Carvajal, F.I.C.S., has been elected Vice-President of the new Mexican Academy of the History of Medicine.

German Chapter: Prof. Dr. A. Lezius, F.I.C.S., Head of the Department of Surgery, Universitäts-Klinik und Poliklinik, Hamburg, Germany, has received the Honorary Fellowship of the Societá Triveneta di Chirurgia of Padua.

News from Paris: Prof. Dr. Raymond Darget, Fellow of the International College of Surgeons and Professor of Urology, University of Bordeaux, has been elected Vice-President of the Urological Society of Paris and will preside at the Congress of Urology, to be held in Paris in October 1951. Prof. Darget cordially invites all Urologists and other interested surgeons to attend.

Physicians of Northern England have formed a new organization which includes roughly the entire Northern Region of England. The principal home of the Society is in Newcastle, but meetings will be held in other large towns of the Northern District. The first program will be devoted to Professor Pybus' experimental work on carcinogenesis.

The **International Society of Clinical Pathology** will convene in London July 16 to 20, 1951. An impressive meeting is in the making. Those interested in presenting papers should address the secretary-treasurer, **Dr. W. H. McMenemey,** Maida Vale Hospital for Nervous Diseases, London, W. 9.

New Books

An Inquiry Into the Causes and Effects of the Variolae and Vaccinae. By Edward Jenner. London: Sampson Low, 1949 (facsimile edition; original printing, 1798). Pp. 75, with 4 illustrations.

Edward Jenner's conscientious transcription of his study of the cause, effect and treatment of smallpox has been studiously reproduced from the most minute Jenner correction to the last flourish of Old English script. Aside from the historical significance of the work, it is interesting to accompany this great pioneer of medical science in his quest for meaningful facts in the solution of what during his lifetime was an almost totally unexplored problem.

After presenting the crucial statement that absorption of cowpox virus in the human system induces immunity against the infection, though to a variable degree, Jenner describes his methods of inoculation, supporting his belief in its efficacy by means of illustrative case studies.

The book's chief interest, aside from its value as a collector's item, is its intimate portrayal of an investigation which ultimately established a canon of medical practice. The peculiarly warm and individual flavor of Jenner's style stimulates interest in the discoverer himself. To the general reader as well as to the connoisseur of medical history this book has value, though naturally the impact of its initial introduction can no longer be felt.

Le Système Neurovasculaire. By Guy Lazorthes. Paris: Masson et Cie, 1950. Pp. 300, with 71 illustrations.

This is an original work on the neurovascular system. While the various questions germane to the subject are to be found in various journals dealing with anatomy, histology, physiology and biochemical and surgical aspects of diseases of the neurovascular system, there is no single volume which embodies all the phases pertaining to the neurovascular apparatus. To accomplish this was the aim of the author, and he has succeeded. He has garnered from the literature all that is known and augmented it by his own experiences. The work opens with the anatomic, histologic and physiologic aspects of the subject matter under discussion. The innervation of the vascular system is thoroughly investigated. This is followed by tracing the various nerve pathways from their center toward the periphery, thoroughly covering the paths of the vasomotor apparatus and those of vasosensibility. The second portion of the book is devoted to a study, region by region, of the neurovascular system. This is of particular value to surgeons and anatomists. The third and fourth sections, dealing with such functions as tonus, vasomotor reflexes and reactions to stimuli, physical examination of the neurocutaneous system, various pathologic entities of the vasomotor apparatus, vascular pains, etc., will be of particular interest to the neurologist anesthesiologist, the internist and the physiologist. The fifth section is devoted to neurovascular surgery, which will prove of particular value to the general surgeon and the neurosurgeon. The operative procedures as well as the preoperative and postoperative care, are lucidly described. The work is up to date and is a worthy contribution to contemporary surgical literature. The illustrations are explicit. The book can be highly recommended to anyone capable of reading French.

La Plesioroentgenterapia Dei Tumori Vescicali. By Pasquale Bruni. Naples: A. Caldarola, 1950.

The author of this fine, compact book, Prof. Bruni, is Chief of the Urological Service of the Tumor Institute at Naples. The major theme of the text concerns the treatment of tumors of the urinary bladder. Special emphasis is placed upon irradiation in the management of these lesions. The technical aspect of roentgen therapy is explained in detail. Dosage, tubes, duration of exposure, etc., are discussed at great length. Many illustrations of the radiation apparatus and tubes are included in the text. Other topics discussed are the tolerance of the patient to this form of therapy and the end results. As a whole, the book is an excellent text for urologists and roentgenologists, and, as such, it is highly recommended.

Congenital Anomalies of the Heart and Great Vessels: Clinicopathologic Study of 132 Cases. By Thomas J. Dry, Robert L. Parker, H. Milton Rogers, Jesse E. Edwards, Howard B. Burchell and Arthur H. Bulbulian. Springfield, Illinois: Charles C Thomas, 1948. Pp. 68, with 80 illustrations.

Closely adapted from a series of lectures given at a meeting of the American Medical Association, these studies of sixteen different anomalies of the heart and great vessels have been modified and some additions included. One addition is the inclusion of short quotations from forerunners in research preceding each case study. The selection of these quotations is based on their influence upon the authors of this text.

In presenting the study the authors have included, in addition to a great number of fine illustrations, a score of case histories listing the principal features of each anomaly and the incidence in each series. The purpose of the study is to correlate all past theory and clinical study with practical application in treatment of the diseases.

The irregularities presented here are those available in the author's pathologic material. They include: cor biloculare, cor triloculare biatriatum, atresia of tricupid orifice, atresia of mitral orifice, persistent common atrioventricular canal, atrial septal defect, ventricular septal defect, Eisenmenger complex, tetralogy of Fallot, complete transposition of the great vessels, persistent truncus arteriosus, patent ductus arteriosus, atresia of the aortic orifice, anomalous aorta and coaretation of the aorta.

Although no conclusions are drawn, these studies, as such, are highly informative.

Your Prostate Gland: Letters from a Surgeon to His Father. By Reed M. Nesbit. Springfield, Illinois: Charles C Thomas, 1950. Pp. 50, with 6 illustrations.

Acting on a tacit assumption that knowledge dispels fear, the author has written a series of letters about disturbances of the prostate gland, methods of examination and methods of treatment, including an explanation of the "open" and "closed" technics of resection. In consideration of the mental qualms accompanying such treatment, he has also discussed the probable results. The inquiry is terminated with a section on cancer of the prostate.

The discussion is intended as a lucid and nonacademic presentation for the layman who is interested in furthering his knowledge of prostatic afflictions. In this respect the author is highly successful. As the title indicates, the work is written in the form of a series of letters from a surgeon to his father. The letters, of which he mentions having kept copies although he never expected them to be read by anyone else, seem a little too well rehearsed for the casual type of letter usually written to one's father. Aside from the form, however, the book is a fine contribution as a nontechnical and informative study of great interest for the uninitiated.

Pathology in General Surgery. By Paul W. Schafer. Chicago: The University of Chicago Press, 1950. Pp. 580, with 495 illustrations (368 in color).

This large, exceedingly handsome and lavishly illustrated volume is a superb presentation of pathology from the clinician's point of view. Three hundred and sixty-eight—that is to say, the majority—of the illustrations are in full color. The added value appertaining to such illustrations in this particular field is almost inestimable. An unusual feature is the generous proportion of gross pathologic specimens reproduced in color, since the usual tendency is to concentrate heavily on the microscopic appearance. Plenty of photomicrographs, of course, are also presented.

Dr. Schafer's text is so planned as to illuminate and explain the organic systems concerned in each particular pathologic condition and to make these descriptions quickly available to the reader. Recent advances in the knowledge of neoplastic growths, both benign and malignant, are well covered.

Material from the Departments of Surgery, Radiology and Pathology of the University of Chicago Clinics furnishes the main basis of the work. The book has great value for the general practitioner as well as for the specialist.

Introduccion al Estudio de la Urologia. By Prof. Dr. A. de la Peña. Valencia: Medicina Española, 1950.

This is a compact work, comprising only 79 pages. It is an excellent study of urology both for the medical student and for the mature urologist. Those who are interested or intend to specialize in this branch of surgery will find, in perusing it, that there is much worth-while material to be gained. The author begins with an introduction of the concepts of urology, giving valuable material on the history of the specialty. This is followed by a description of the fundamentals essential to the acquisition of a thorough knowledge of the subject matter involved. Even the experienced urologist will find much worth-while material in the text, including selection of students, highlights in the preparation of scientific papers on urology, successful organization of didactic procedures, and effective conduct of classes. Those who read Spanish will find this work valuable and well worth while. It should be translated into other languages.

Anoxia, Its Effect on the Body. By Edward J. Van Liere. Chicago: University of Chicago Press, 1942; second impression, 1943.

This small volume is an excellent presentation of the physiologic aspects of anoxia. Many of the chapters are compilations of the author's previous experiments and publications. Other research students have added to current knowledge of anoxia by formulating premises founded upon some of the information emphasized in several of the chapters contained in this excellent treatise. Some reference is made to the work of Prof. A. Gemelli of Milan. This is an outstanding book, worthy of the

attention of the research physiologist and the clinician.

Plastic and Reconstructive Surgery. By Ferris Smith. Philadelphia: W. B. Saunders Company, 1950. Pp. 895, with 592 illustrations.

This is a directive manual for skilled plastic surgeons. The author does not recommend its use by the inexperienced surgeon except under close supervision by an expert.

Special emphasis is placed on such developments, occurring within the period since World War I, as the use of the tubed pedicle and its conveyed flaps, the use of Indian forehead flaps in facial repair, and the popularization of the skin grafts of Thiersch, Reverdin and Wolfe.

The illustrations throughout are excellent and well explained, and those demonstrating end results of plastic correction are impressive. The plastic surgery of burns is exhaustively treated.

As is suitable to a book intended as a working manual, the material here is wholly factual and didactic, not literary. The book should be of great practical use not only to the practitioner but to the instructor in plastic surgery of the human body.

Cirugia Retropubica Urinaria. By Terence Millin. Spanish adaptation by Prof. Dr. Alfonso de la Peña. Madrid: Editorial Saturnino Calleja, S.A., 1950. 180 illustrations.

The works of Terence Millin in retropubic urinary surgery are very well known to the English speaking public, particularly those on retropubic prostatectomy. This translation of the original work from English into Spanish is exceptionally well done, and one who reads Spanish, whether he is a urologist or a general surgeon, will find it a welcome addition to his library. The author accomplished this translation under the direction and supervision of Terrence Millin. The material presented is thorough, the illustrations are excellent, the paper and printing of high grade. Particularly well chosen and well presented are the color plates. When one speaks of Millin one immediately connects his name with retropubic prostatic surgery, but this work also embraces other urologic subjects of interest. The greater part of the text is devoted to retropubic prostatectomy, but such subjects as prostatic carcinoma, calculosis of the prostate, carcinoma of the bladder, traumatic rupture of the posterior urethra, prostatic abscesses, etc., are also described.

Chirurgie Réparatrice et Correctrice des Téguments at des Formes. By L. Dufourmentel. Paris: Masson et Cie., 1950. 2d ed. aug. Pp. 400, with 457 illustrations.

The first edition of this work appeared in 1939. Since World War II, the specialty of reconstructive surgery subsequent to injury has gathered momentum. The author, a pioneer in this field, stresses the importance of reparative surgery from every point of view (functional, esthetic and economic). The present volume is brought up-to-date. Following the introduction, chapters on surgery of the tegumentary structures (nose, fronto-orbital region, jaws, ears, etc.) are given thorough consideration. The illustrations are good. Postoperative care, prosthesis and other matters germane to the subject are taken into consideration. A bibliography follows each chapter. The paper and printing are excellent. The work can be recommended for all interested in plastic and reconstructive surgery and for those who read French.

The **Fifth Peruvian Congress of Surgery** will be held in Arequipa, Peru, from March 25 to 29, 1951, under the presidency of **Dr. Amador Merino Reyna.** The themes to be discussed are the following:

1. Cesarean section
2. Acute cholecystitis
3. Compound fractures

For information, address **Dr. Ricardo Angulo,** Secretary of this Congress.

Abstracts from Current Literature

Diphtheria of the Granulating Wound; Its Treatment with Methylene Blue. Melchior, E., Surgery **27**:600, 1950.

This author presents again his findings that pulverized methylene blue applied to diphtheria-infected granulating wounds will instigate a clearing up of the infection with subsequent healing of the wound. An additional series of 10 cases is reported, in all of which a cure was accomplished. Although diphtherial infection of superficial wounds is not common, it is occasionally encountered and has in the past presented quite a problem in therapy. It seems as though in the light of failure of other methods, a trial of this method would be desirable.

HARVEY E. BILLIG

Coarctation of the Aorta and Its Treatment. Burford, T. H., Surg. Clin. North America **30**:1249, 1950.

Typically the coaretation segment is short and situated just distal to the ligamentum arteriosum and the left subclavian artery. On rare occasions it may be found at lower levels, with coaretation occurring even in the thoracic aorta. The constrictions involving the distal arch or the upper descending portion, or both, are of two types, the infantile and the adult. They differ both anatomically and functionally and thus give rise to different clinical pictures. In the *infantile* type (preductile), there is a large atretic segment in which the origins of the left subclavian and left common carotid are not infrequently involved, and the segment lies *proximal* to a patent ductus arteriosus. This is a serious lesion and almost always leads to death during the first few weeks of life. During this time there develops the picture of cardiac embarrassment and failure. The blood pressure in the upper extremity is elevated, and no pressure can be obtained in the legs; the femoral pulse, however, can be readily obtained. The presence of murmurs is of little help. The lesion should be suspected in a noncyanotic infant with heart failure and who presents a higher blood pressure in the upper extremity than in the lower. In the *adult* type (postductile), the narrowed segment is short. This type lends itself more easily to surgical correction. The complaints in this patient are variable. They relate directly to the hypertension in the upper portion of the body and to a lesser degree to the decreased blood flow to the lower extremity. Headaches are the most common complaint. The physical signs make recognition fairly easy. A difference in the blood pressure of upper and lower extremity is significant; if hypertensive in the arms and normotensive or hypotensive in the legs, the diagnosis is virtually established. The presence of bruits or thrills in an abnormal area (due to collateral channels) should arouse suspicion. Roentgenographic findings are notching of the inferior rib margins and lack of prominence of the aortic knob. Retroarterial visualization results in diagnostic precision, and aortograms are suggested in all cases in which surgical intervention is contemplated.

It is of interest to note that functionally these two types differ fundamentally. In the infantile type with obstruction of the aortic isthmus the circulation distal to the obstruction is from the pulmonary artery by way of the patent ductus to the descending aorta, and thus there is no stimulus to the development of adequate collateral circulation. In the adult type, on the other hand, even when the obstruction is complete the ductus goes on to obliteration and an enormous set of collateral channels develop; these collaterals are dependent chiefly upon the subclavian artery.

The nature of the hypertension has had various explanations. The author mentions the excellent article of Bing in this connection, and it was thus felt worth while to review the latter article. Bing expressed the opinion that the hyptertension is not attributable to a renal pressor mechanism but is due to the resistance of the stenosis and the collaterals.

Prognastically this is a serious disease, 40 per cent of the patients dying between the ages of 16 and 30. Degenerative changes in the proximal aorta and its branches are contributing causes; aneurysm, with rupture and particularly cerebrovascular hemorrhage, takes the highest toll.

In suitable cases, operative treatment consists of resection of the constricted segment with end-to-end anastomosis. The details, with illustrations, complete this article.

RAYMOND GREEN

The Dumping Syndrome: An Operation for Its Prevention. O'Neill, T., Brit. M. J. **2**:15, 1950.

A high percentage of patients who have undergone gastrectomy or, less frequently, gastroenterostomy complain of weakness, occasional nausea and an unpleasant sense of warmth over the entire body shortly after taking food. A cold sweat appears on the face, the heart rate becomes rapid and there is often a rise in blood pressure. This condition is referred to as the dumping syndrome. Many investigators have attempted to determine the cause

of these symptoms. It is now generally considered that rapid emptying of the stomach and distention of the jejunum are the most significant factors.

The literature indicates that the dumping syndrome occurs in from 15 to 75 per cent of patients who have undergone partial gastrectomy. The author investigated 148 cases in which he had done partial gastrectomies. In the majority of these he had carried out the Hoffmeister-Finsterer procedure. On only 3 patients was the Polya method used; in all of them the dumping syndrome developed. The incidence of the dumping syndrome was 20.9 per cent in the entire series. It is generally believed that when the entire width of the sectioned stomach is used in the gastrojejunal anastomosis, as in the Polya operation, the symptoms are much more likely to occur than when the stoma is made smaller.

The author expresses the opinion that the valve produced by the Hoffmeister procedure tends to prevent the flow of bile into the stomach and to forestall the retrograde passage of food into the duodenum, and also results in the passage of material from the stomach into the jejunum in a less precipitate manner.

A method of anastomosis is described by the author, in which the stoma occupies the middle of the cut end of the stomach. This results in a valve above the stoma, as in the Hoffmeister procedure, and also one below. It is believed that the lower valve is more important and that it prevents food from passing from the esophagus to the jejunum without a preliminary period of retention in the stomach.

Forty-eight patients have been investigated after undergoing anastomosis by the author's method. None had severe symptoms; 1 had an occasional attack of weakness about two hours after meals; 1 had slight attacks of indigestion after breakfast, and another had a sensation of fulness after a large meal.

J. O. MORGAN

Annular Pancreas. Ohlmacher, A. P., and Marshall, E. A., Am. J. Surg. **79**:473, 1950.

Fewer than 60 cases of annular pancreas have been reported. Ohlmacher and Marshall's patient is the thirteenth to invite and the ninth to survive surgical management.

This rare developmental error is presumed to be the product of failure of fusion between the ventral and dorsal pancreatic anlagen. It produces symptoms when the constricting effect is sufficient to obstruct the duodenum or the common bile duct.

Up to the present, only Lehman has been able to make even one exact properative diagnosis, in the case of a 23-year-old man. Two 3-day-old patients are numbered among the surgically treated 13. Both survived after posterior gastroenterostomy in the one who had also duodenal atresia, and duodenojejunostomy in the other.

No case has been reported of the survival of an infant with annular pancreas associated with jaundice. Choledochoenteroanastomosis would appear to be the procedure necessary to bypass the obstruction under such circumstances.

For relief of the duodenal obstruction it seems that duodenojejunostomy is the procedure of choice during infancy, while partial gastroduodenal resection with gastrojejunostomy is given primary consideration for complicated cases of annular pancreas occurring in adults.

On the basis of the very small series of collected cases, resection or simple division of the ring of pancreatic tissue was not satisfactory. All 4 patients so treated survived, but temporary pancreatic drainage and a tendency to persistence of symptoms reduced the desirability of the procedure.

Posterior gastroenterostomy in 5 cases was unaccountably distinguished by 4 fatalities. Although these cases were reported in 1906, 1928, 1930 and 1931, the authors have introduced this evidence as an argument favoring the more radical partial gastrectomy, although theoretically a simple gastroenterostomy should be relatively satisfactory in relieving this unusual condition.

THOMAS WILENSKY

Repair of the Collateral Ligaments of the Knee. McConville, B. E., Surg., Gynec. and Obst. **90**: 291, 1950.

This brief survey summarizes the pertinent points and the basic orthopedic considerations that apply to this type of injury. It is maintained that the majority of injuries to the collateral ligaments will respond to conservative east treatment. It is believed that the technic of McMurray and Phillips for repair of the medial ligament, employing the uninterrupted tendon, is the procedure of choice, whereas repair of the lateral ligament with the iliotibial band gives the greatest benefit. It has been seen that occasionally the lateral instability of the knee joint is partially due to a rent in the fibrous capsule of the knee joint and that the lateral ligament is only partially torn. A careful repair of both the lateral ligament and the fibrous capsule will give good stability. A No. 0 zytor suture is employed. An imbrication of the iliotibial tract increases stability when the capsule ligament has been stretched or frayed. Sixteen repairs of collateral ligaments have been performed—10 in which the lateral ligament alone and 6 in which the medial ligament was involved. Recovery was complete, a stable joint resulting.

HARVEY E. BILLIG, JR.

Cor Triloculare Biatrium. Shechter, F. R., and Greenspan, H. S.: J.A.M.A. **144**:100, 1950.

Cor triloculare biatrium is a rare congenital anomaly representing but 2.7 per cent of patients with congenital cardiac anomalies. Cor triloculare is a three-chambered heart, consisting either of 2 atria and 1 ventricle and called cor triloculare biatrium, or consisting of 2 ventricles and 1 atrium and called cor triloculare biventriculare.

Because of the rarity of this entity, the authors report their experience and cite the case history of a child aged twenty-two months who was operated upon. They follow the criteria established by G. O. Favorite as necessary to establish the diagnosis. These consist of: (1) a common large ventricle receiving the auriculoventricular orifices and the orifice of one of the great vessels; (2) a defective interventricular septum, and (3) one of the great vessels leading into the rudimentary ventricle.

The cardiac observations are variable. The roentgenologic and fluoroscopic data, however, are important. In the anteroposterior position there is marked dilatation of the pulmonary conus; in the left anterior oblique there is no such evidence, indicating that the exaggerated shadow in the region of the pulmonary segment is the rudimentary outlet chamber. If the patient survives for several years, the heart enlarges and the apparent prominence of the pulmonary conus disappears. The contour of the heart remains the same regardless of the position of the great vessels. The hilar shadows differ according to their position. If the pulmonary artery arises from the common ventricle there is an excessive blood supply to the lungs, producing severe pulmonary congestion. If the pulmonary artery originates from the outlet chamber the hilar shadows may be decreased or absent. If the aorta is located in the outlet chamber the aortic shadow is narrow, and the reverse is true if the aorta is located in the common ventricle. In the latter case the heart simulates that associated with the tetralogy of Fallot. The electrocardiogram is of little aid.

RAYMOND GREEN

The Use of Decamethonium Bromide for the Production of Muscular Relaxation. Harris, L. C., Jr., and Dripps, R. D.: Anesthesiology **11**:215, 1950.

A report of the results in 250 cases in which decamethonium bromide (syncurine) was used for muscle relaxation in conjunction with general anesthesia. Decamethonium bromide is a synthetic agent prepared originally by the English and used by them in clinical anesthesia.

Of these cases, decamethonium bromide produced satisfactory degrees of relaxation in all but 2. Of especial interest is the fact that there were no instances of bronchospasm or hypotension. In comparison, -d-tubocurarine will produce bronchospasm and hypotension due to its histamine-like reactions. Syncurine used in amounts sufficient to cause adequate relaxation caused definite respiratory depression. This depression was directly related to the size of the dose.

A single dose of decamethonium bromide acts rapidly, its effect reaching a maximum within three or four minutes, beginning to wear off in eight to ten minutes and completely disappearing in twenty to thirty minutes.

There seems to be no drug that is of value as an antagonist for decamethonium bromide. Should respiratory depression become too great, adequate ventilation with oxygen is the most satisfactory treatment.

This synthetic agent, therefore, has the advantage of its lack of histamine reactions as compared to curare, with apparently the same relaxing power. Also, its shorter period of action may have some advantage in allowing the patient to react more quickly from general anesthesia.

VERNON N. BALOVICH

Osteoid Osteoma. McKeever, F. M., West. J. Surg., Gynec. and Obst. **58**:213, 1950.

A precise and careful description of osteoid osteoma is presented. This lesion has been erroneously identified as sclerosing osteomyelitis and chronic periostitis with a bacterial origin. Jeffe's investigation and report is duly mentioned by the author. Pain is a prominent symptom and may be intermittent at the beginning but becomes constant thereafter. Weight loss is due to pain and loss of rest. The physical signs are not important, but tenderness over the thickened area of the bone without redness is a consideration. The roentgen radiopaque picture of a nodule surrounded by a radiolucent area and sclerosis of the bone with some periosteal proliferation is characteristic but comes on late in the progress of the lesion. Overexposure may be necessary to bring out this nidus when there is considerable sclerosis.

Pathologically the reddish brown granular lesion is surrounded by dense bone. Microscopically the tumor is composed, on its periphery, of spindle cells forming a small amount of connective tissue, while the remainder is filled with islands of osteoid tissue. As a rule no inflammation is present. The surrounding dense bone resembles periosteal new bone lamellated in appearance.

Complete relief is obtained when the nidus is removed but it is not necessary to remove all of the dense bone.

ELIAS N. KAISER

Lateral Dislocation of the Subtaliod Joint. Lawson, R. S., Australia and New Zealand J. Surg. **19**:259, 1950.

The author presents a complete case record and limits the rest of his paper to a discussion of the ligamentous supporting mechanism of the talus. His comment brings forth the variations which exist in a talocalcanean ligament and the lateral support to the talus as provided by the calcaneal tibial and the calcaneal fibular ligaments. The blood supply to the talus is assumed to be conveyed via the capsule of the ankle joint or by small branches of the anterior tibial artery entering the dorsal surface of the talus through the superior talonavicular ligament.

ELIAS N. KAISER

Reflex Sympathetic Dystrophy of the Upper Extremity (Hand-Shoulder Syndrome). Bayles, T. B.; Judson, W. E., and Potter, T. A.: J.A.M.A. **144**:537, 1950.

The authors attempt to clear up confusion in the diagnosis of this syndrome. They present data on 17 patients, showing that a variety of stimuli, such as pain from the viscera, blood vessels, heart or musculoskeletal system may produce this neurovascular response. Stellate ganglion block of the afferent pain fibers or sympathectomy may arrest this abnormal physiologic condition.

CLAUDE M. WARREN

Puerperal Gangrene. Clain, A., and Nussbaum, L. L.: Lancet **2**:290, 1950.

Gangrene associated with childbirth is a long-established though rare entity. The cause may be (*1*) arterial embolism, (*2*) arterial thrombosis, (*3*) arterial spasm secondary to thrombophlebitis, (*4*) venous thrombosis alone or (*5*) a combination of these.

Audier and Haimovici in 1938, in an excellent review of gangrene of venous origin, attributed wet gangrene in the puerperal period to venous occlusion and dry grangene to arterial occlusion. They pointed out that gangrene associated with thrombophlebitis may stimulate arterial embolism, and they described a triad of symptoms observed in these cases of venous gangrene; i.e., severe pain in the affected limb, rapidly developing cyanosis (phlegmasia caerulea dolens) and edema.

Arterial spasm secondary to thrombophlebitis is probably the cause in most cases at present. Thus the appearance of the triad of Audier and Haimovici should be the signal for energetic antispasmodic and anticoagulant therapy. Haimovici and Suffness (1948), however, in a discussion of gangrene of venous origin, expressed the opinion that arterial spasm plays a minor role in the causation and that the widespread venous thrombosis present prevents the venous return and there is thus a state of blood stasis with consequent tissue anoxia leading to gangrene. Sepsis and ergot now play a minor role in puerperal gangrene.

The authors present a case of puerperal gangrene due to arterial spasm secondary to thrombophlebitis. They note that phlegmasia alba dolens should be energetically treated, because it involves not only morbidity (i.e., chronic edema of the affected leg) but a local mortality (i.e., gangrene). In addition, they note that pulmonary embolism is associated with this type of case.

CHARLES C. ABBOTT

Hydatid Cyst of the Right Auricle with Metastatic Pulmonary Echinococcosis and Chronic Pulmonary Hydatidosis Causing a Parasitic Obstruction of the Left Pulmonary Artery and Its Branches. Plaggio, R. A.; Dubourdieu, J. J.; Dighiero, J.; Canabal, E. J., and Grosso, O. F.: Arch. Uruguayos de Med., Surg. y Especialidades **36**:530, 1950.

This paper reports the case of a patient who had a hydatid cyst of the right auricle which ruptured into the auricular cavity and created different pulmonary and cardiovascular complications, the first of which was metastatic echinococcosis, whereas the latter complication produced a syndrome of long standing, suggestive of chronic hypertension of the lesser circulation, which resulted in cardiac insufficiency. It was reasoned that the mechanism involved in the cardiovascular complications took the following sequence: The hydatid cyst ruptured within the auricle, producing an obstruction of the left branch of the pulmonary artery. There developed an aneurysmal dilatation of the vessel which secondarily produced echinococcosis and an embolic process of hydatid cysts formation. These invaded the various branches of the pulmonary artery, creating chronic hypertension of the lesser circulation and finally a cor pulmonale of hydatid origin.

The hydatid obstruction was observed to be located in the left pulmonary artery and its divisional branches area. The right pulmonary artery and its branches were patent and void of any obstruction. This confirmed the possibility of chronic hypertension of the lesser circulation induced by prolonged obstruction of one of the two main branches of the pulmonary arteries.

This process created tremendous hypertrophy of the right ventricular walls equal in dimension to that of the left ventricle wall.

In the authors' opinion this is the first case of chronic cor pulmonale of hydatid origin with obstruction of the pulmonary artery to be diagnosed clinically and confirmed at operation.

Armamentarium

Surgical Scrub Soap: Huntington Laboratories, Inc., have announced that their product Hexachlorophene Germa-Medica, a liquid surgical scrub soap containing the unique new germicide hexachlorophene, has been accepted by the Council on Pharmacy and Chemistry of the American Medical Association.

Hexachlorophene Germa-Medica is the first antiseptic surgical soap to be accepted by the Association. It contains 1 per cent Hexachlorophene, the equivalent of 2½ per cent on the anhydrous soap basis. Huntington reports, based on extensive laboratory testing and practical use in leading hospitals, claim that the antiseptic soap cleanses more thoroughly than the conventional scrub-up. Less time is required, and the brush and germicidal rines may be eliminated. Another advantage cited is the residual effect of the germicidal soap. The bacteria count remains at safe levels throughout the day when the soap is regularly used for all washes. No evidence of irritation has been reported.

A complete technical report of independent research findings on the use and effectiveness of Hexachlorophene Germa-Medica may be obtained by writing to Hospital Division, Huntington Laboratories, Inc., Huntington, Indiana.

Surgical Sutures in Glass: In response to requests from many hospitals for D&G surgical sutures in glass jars, Davis & Geck, Inc., a subsidiary of American Cyanamid Company, has made all the popular products available in a new, attractive glass jar. D&G sutures in glass jars are carried in stock and are available for immediate shipment.

Although the hospital and the surgeon are primarily interested in the quality of the sutures rather than in the actual physical packaging, the glass jar offers advantages, the most notable of which is its transparency. The contents of the jar are visible at all times so that sutures may be reordered before they are completely used up.

Many operating room nurses have long been accustomed to the use of glass containers for storing sutures and prefer them. Chrome plated covers are supplied free of charge with the initial order.

Water Filter: The LaMotte Filtr-Ion, a low-cost, disposable unit for small scale production of chemically pure water for use in general scientific work, has been made available by the LaMotte Chemical Products Company of Baltimore. It is said to deliver neutral (pH 7) water free of mineral ions and is recommended for the preparation of reagent solutions.

Scaling Unit: The Nuclear Instrument and Chemical Corporation of Chicago offers the Count-O-Matic Scaling Unit, a "complete packaged counting system" with scaling units for every type of radiation counting. The scaler, it is claimed, can be set to count automatically a predetermined number of counts and indicate, on an attached electric timer, the time required to register the pre-set number of columns. Information and catalog can be obtained from the manufacturers, whose address is 237 West Erie Street, Chicago 10.

Institute of Industrial Health: General Motors, in collaboration with the University of Michigan, is establishing The Institute of Industrial Health at Ann Arbor, Mich., whose broad objectives will be research, education and service in industrial medicine, health and safety.

The long-range research project will be administered by a board to be appointed by University of Michigan Regents.

Scheduled for expansion in the Institute's program is GM's pioneering cooperative program between the Corporation and the nation's medical schools, whereby graduates from these schools interested in industrial medicine are able to take their in-plant training in GM plants. The Institute will provide fellowships, scholarships, and hospital residences in Industrial Medicine, Health and Safety.

Expanded Facilities: The American Cyanamid Company has announced construction of a 100,000 square foot building in Chicago's Addison-Kimball District, which will be leased to this chemical firm. The building will contain 80,000 square feet of warehouse space on the first floor and 20,000 square feet of air-conditioned offices on the second floor. Additional land at the site affords an expansion potential should it be required at a later date.

Among the units of the Company which will use the new facilities are Calco Chemical Division's Dyestuffs Department, Pigment Department and Bulk Pharmaceutical Department; The Industrial Chemicals Division, The Agricultural Chemicals Division, The Plastics and Resins Division, The Explosives Department and Lederle Laboratories Division's branch office, local sales office, and Animal Nutrition Department.

American Cyanamid Company is the fourth largest chemical manufacturing concern in America, and serves over two hundred industries with more than five thousand items. It is believed by Company officials that service to its Midwestern customers will be materially improved by the new consolidated facilities.

In Memoriam

WILLIAM EARL SMITH

M.D., F.A.C.S., F.I.C.S.

William Earl Smith died on June 22, 1950 at the age of 65. Born in Manistee, Michigan, Dr. Smith received his medical degree at the University of Michigan. He did postgraduate studies in Vienna, New York and Chicago, and served his interneship and hospital residencies in New York at the New York City Hospital and the Kings County Hospital, respectively. For many years he had been affiliated with the Stamford Hospital and the Saint Joseph's Hospital, both of Stamford, Connecticut, as attending surgeon. His practice was devoted entirely to general surgery. Dr Smith was a member of the American Medical Association, the American College of Surgeons, the Stamford Medical Society, the Fairfield County Medical Society, the Connecticut State Society, the New York City Hospital Alumni Society, and the International College of Surgeons. Dr. Smith held an enviable reputation in his community both for his surgical skill and for his high ethical standards.

WALTER RICHARD GRIESS

M.D., F.A.C.S., F.I.C.S.

Recently Dr. Walter Richard Griess of Cincinnati, Ohio, passed away at the age of 74 after a long and active practice. Dr. Griess studied at the University of Cincinnati Medical Department and the Cincinnati College of Pharmacy, doing postgraduate work at the University of Berlin. After serving as resident physician at the Cincinnati General Hospital for four and one-half years he was, at various periods, a Member of the Staff of St. Mary's Hospital, Deaconness Hospital and Bethesda Hospital, and for many years was Director of Surgical Service at the Children's Hospital. In addition to positions on hospital staffs, Dr. Griess was Consulting Surgeon for the Baltimore and Ohio Railroad and the C & O Railroad and was Chief Medical Officer of the Cincinnati Union Terminal Company. His practice was devoted almost exclusively to general and orthopedic surgery. Teaching positions, either as lecturer or instructor, were held at the following institutions: the Miami Medical College, the Laura Memorial College and the Ohio Miami Medical College (Department of the University of Cincinnati). He resigned the latter post to become a trustee of the University of Cincinnati. Dr. Griess also lectured for years at and later became dean of the Cincinnati College of Pharmacy and Biochemistry.

In addition to membership in the International College of Surgeons, Dr. Griess was a member of the American Medical Association, the American College of Surgeons, the Society for the Study of Internal Secretions, the Cincinnati Research Society and the Cincinnati Academy of Medicine.

JOHN HOWARD GARBERSON

M.D., F.A.C.S., F.I.C.S.

On August 9, 1950, Dr. John Howard Garberson of the Garberson Clinic of Miles City, Montana, died at the age of 67. A native of Iowa, Dr Garberson received his preliminary education in Alta, Iowa and his B.Sc. degree from Iowa State. In 1907 he graduated from the Northwestern University Medical School and began his internship at the Cook County Hospital in Chicago. A a postgraduate student Dr. Garberson was associated for several years with various clinics of the United States and Europe. Subsequent to this he served as surgeon and consultant at the Holy Rosary Hospital and the Garberson Clinic, both of Miles City, Montana. He was also for many years District Surgeon with the Chicago, Milwaukee & St. Paul Railroad. In a teaching capacity, he was Instructor of Surgery at the Holy Rosary Hospital School for Nurses. With the United States Medical Reserve Corp., Dr. Garberson held the rank of Major. His practice was devoted exclusively to general surgery.

Dr. Garberson was a member of the following Medical and Surgical Societies: the American Medical Association, the American College of Surgeons, the Eastern Montana Medical Association, the American Board of Surgery, the Montana Medical Association (Past President), and the International College of Surgeons. He was also a member of the Montana State Board of Medical Examiners.

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CALENDAR OF MEETINGS

May, 1951

21-25.....Société Internationale de chirurgie orthopédique et de traumatologie
Stockholm
Dr. J. Delchef
34, rue Montoyer, Brussels

July, 1951

International Society of Blood Transfusion
London
Centre national de Transfusion sanguine
M. Bernard Rouzet
6, rue Alexandre Cabanel, Paris

16-21.....Joint Meeting, British Medical Association and Medical Association of South Africa
Johannesburg, South Africa
H. Moross, General Secretary
5 Esselen Street, Johannesburg, South Africa

September, 1951

3-7.....International Anesthesia Research Society
London
Mr. R. W. Cope
University College Hospital, W C 1
London, England

10-13.....United States Chapter, International College of Surgeons
Palmer House, Chicago
Dr. Arnold S. Jackson
1516 Lake Shore Drive, Chicago 10, Illinois

October, 1951

1-6.....Congrès de l'Association française de Chirurgie
Paris
Prof. Brocque
12, rue de Seine, Paris 6ème

Congrès francais d'Oto-Rhino-Laryngologie
Paris
Dr. H. Guillon
6, avenue MacMahon, Paris

December, 1951

American Medical Association Clinical Session
Dr. George F. Lull
535 North Dearborn St., Chicago 10, Illinois